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(12) **United States Patent**
Benjamin et al.

(10) **Patent No.: US 11,661,708 B2**
(45) **Date of Patent: *May 30, 2023**

(54) **RAILROAD SPIKE REMOVER**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **17/486,900**

(22) Filed: **Sep. 27, 2021**

(65) **Prior Publication Data**

US 2022/0090331 A1 Mar. 24, 2022

Related U.S. Application Data

(63) Continuation of application No. 16/734,125, filed on Jan. 3, 2020, now Pat. No. 11,131,066, which is a (Continued)

(51) **Int. Cl.**
E01B 29/26 (2006.01)

(52) **U.S. Cl.**
CPC ***E01B 29/26*** (2013.01)

(58) **Field of Classification Search**
CPC E01B 29/26
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

577,783 A 2/1897 Powell
737,530 A 8/1903 Tillberg
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2969795 A1 12/2017
DE 520526 C 3/1931
(Continued)

OTHER PUBLICATIONS

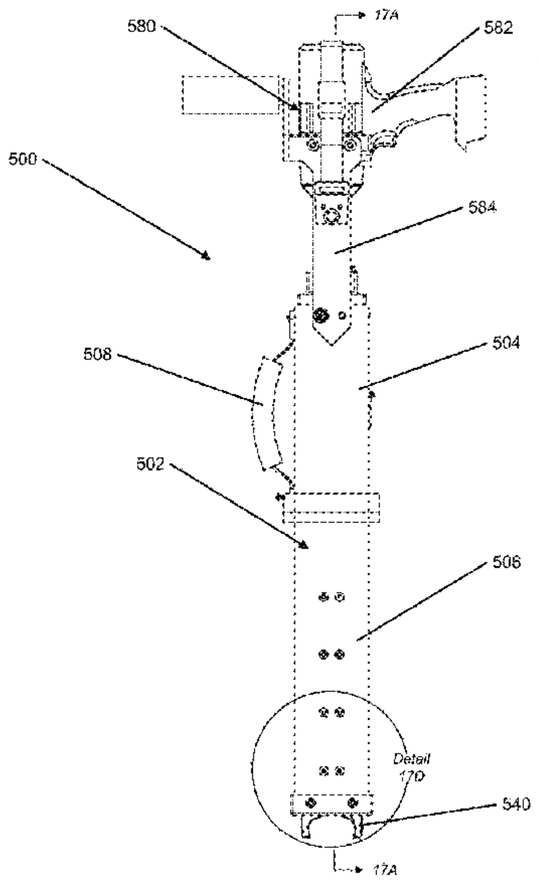
Extended European Search report in Appln. No. 17174787.6, dated Nov. 3, 2017.
(Continued)

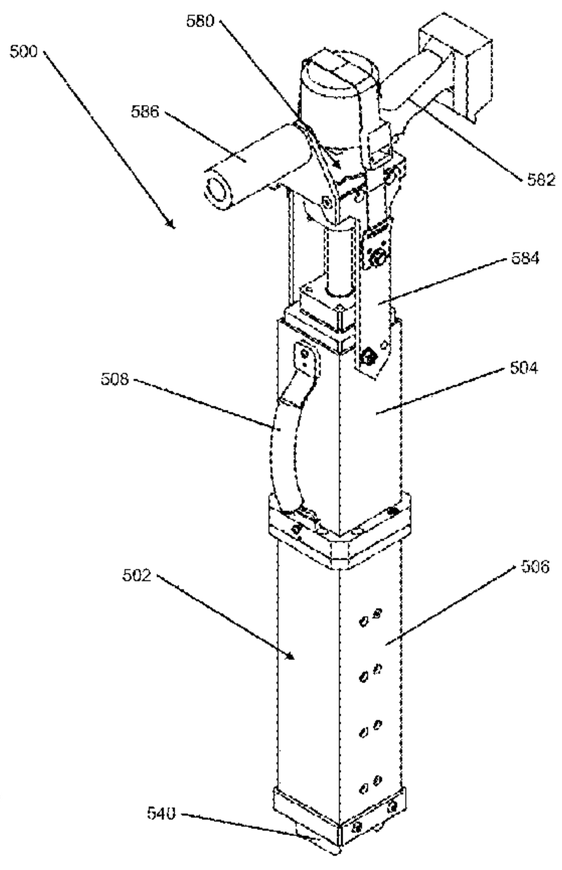
Primary Examiner — Nirvana Deonauth
(74) *Attorney, Agent, or Firm* — Banner & Witcoff, Ltd.

(57) **ABSTRACT**

A portable railroad spike remover comprises a claw assembly extractor that is shaped to engage and secure a railroad spike previously installed into a rail tie. The claw assembly extractor may include a pair of jaw members that are pivotally connected to each other by a pivoting pin and a rotating pin. Each jaw member may include a lower end configured to contact and secure a railroad spike and a pair of upper members interlocked with each other and pivotally connected to the clevis fastener with the rotating pin. When the drive shaft is rotated, the claw assembly extractor and the mounting flange may move inside the main housing in a vertical direction to extract the railroad spike from the rail tie.

16 Claims, 32 Drawing Sheets





Related U.S. Application Data

continuation-in-part of application No. 15/175,900, filed on Jun. 7, 2016, now Pat. No. 10,597,828.

(60) Provisional application No. 62/788,925, filed on Jan. 6, 2019.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,830,269	A	11/1931	Ford	
2,639,887	A	5/1953	Henry	
2,691,505	A	10/1954	Hursh	
2,735,649	A	2/1956	Swallert	
3,594,890	A	7/1971	Cordell et al.	
3,830,633	A	8/1974	Harbottle	
4,273,052	A	6/1981	Woolner et al.	
4,538,793	A	9/1985	Dieringer et al.	
4,579,061	A	4/1986	Dieringer	
4,928,600	A	5/1990	Urmson, Jr. et al.	
5,465,667	A	11/1995	Hosking et al.	
5,924,679	A	7/1999	Wilson	
6,095,053	A	8/2000	Johnsen et al.	
6,098,960	A	8/2000	LeFavour et al.	
6,113,073	A	9/2000	Lefavour et al.	
6,223,410	B1 *	5/2001	Sroka	B25B 27/062 29/261
6,718,851	B1	4/2004	Peggion	
7,353,757	B2	4/2008	Eldridge	
8,371,556	B2	2/2013	Price	
8,485,103	B2	7/2013	Miller et al.	
9,637,867	B2	5/2017	Burns	
9,839,999	B2	12/2017	Kittell	
2007/0113752	A1	5/2007	Eldridge	
2009/0236572	A1	9/2009	Laun	
2011/0067528	A1	3/2011	Price	
2012/0199037	A1	8/2012	Miller et al.	
2013/0240806	A1	9/2013	Crover	
2016/0023873	A1	1/2016	Kasan	
2016/0040365	A1	2/2016	Burns	
2017/0058461	A1	3/2017	Weatherill et al.	
2017/0350078	A1	12/2017	Benjamin et al.	

FOREIGN PATENT DOCUMENTS

EP	1041203	A1	10/2000
EP	3255207	A1	12/2017
GB	168101	A	9/1921
GB	794433	A	5/1958

OTHER PUBLICATIONS

Extended European Search Report in Appln. No. 19216949.8 dated Mar. 18, 2020.

Extended European Search Report in Appln. No. 20150387.7 dated May 12, 2020.

International Search Report in Int'l Application PCT/US2020/067660 dated Apr. 16, 2021.

Stanley Hydraulic Spike Puller SPL31A-Nm SPL31A-S User Manual, Black & Decker, Inc. (2013).

* cited by examiner

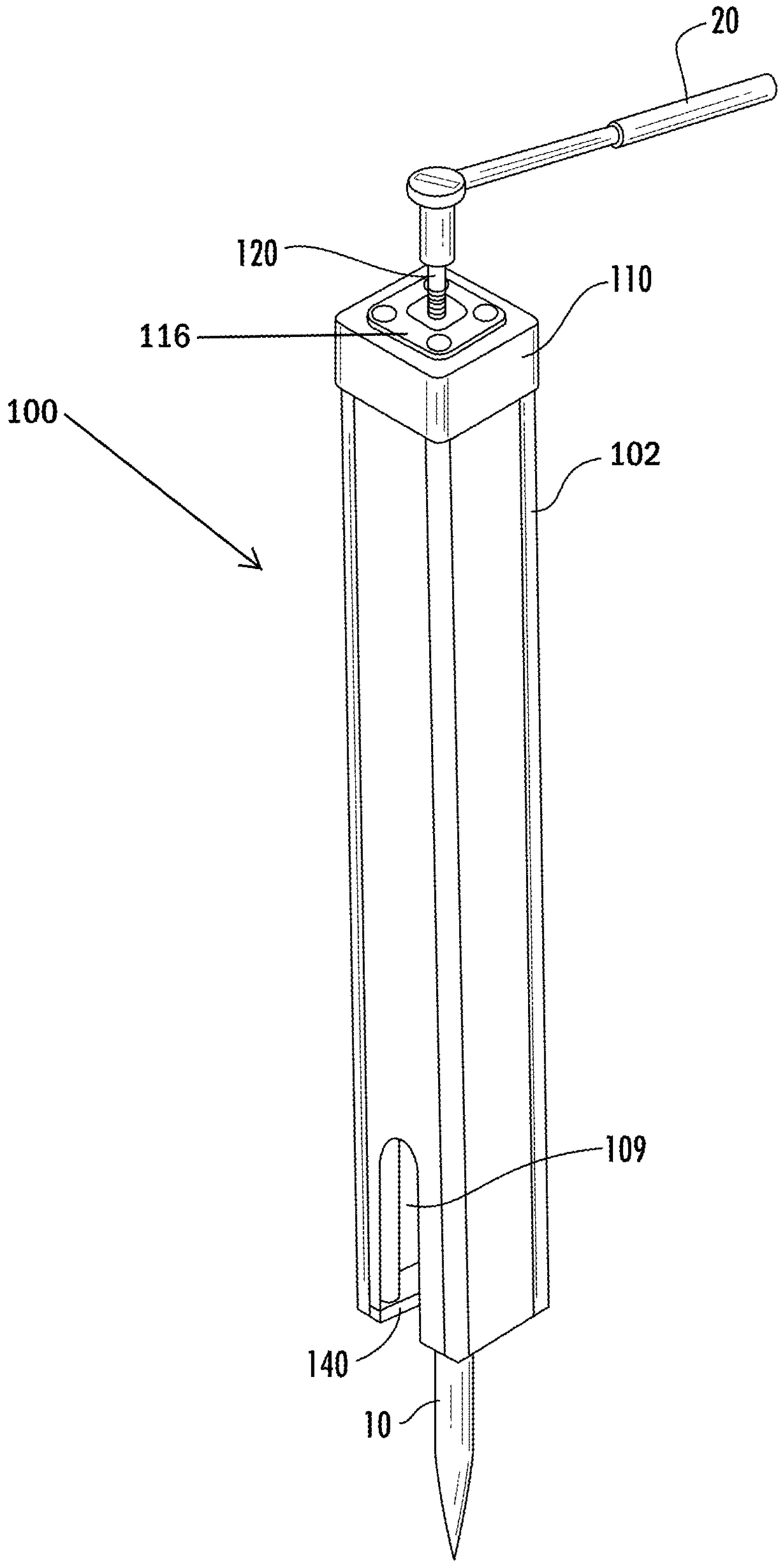


FIG. 1

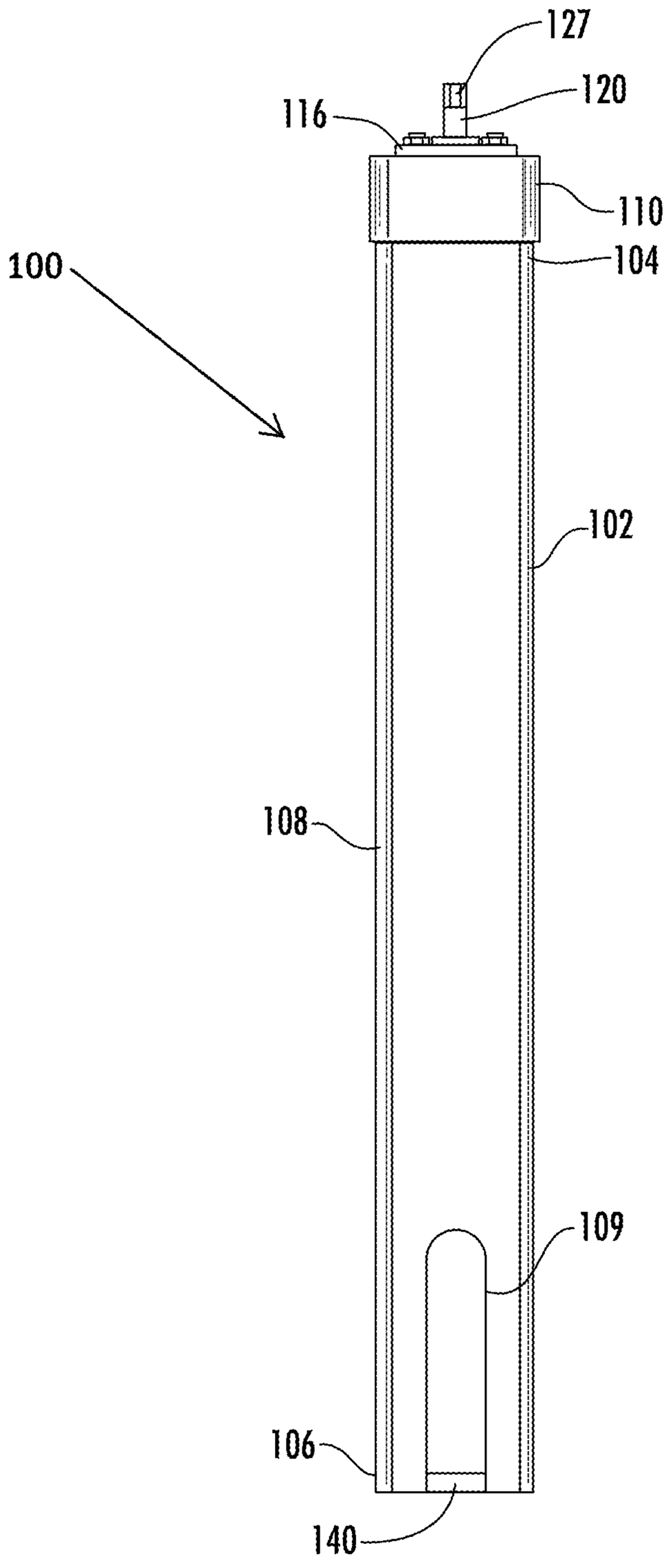


FIG. 2

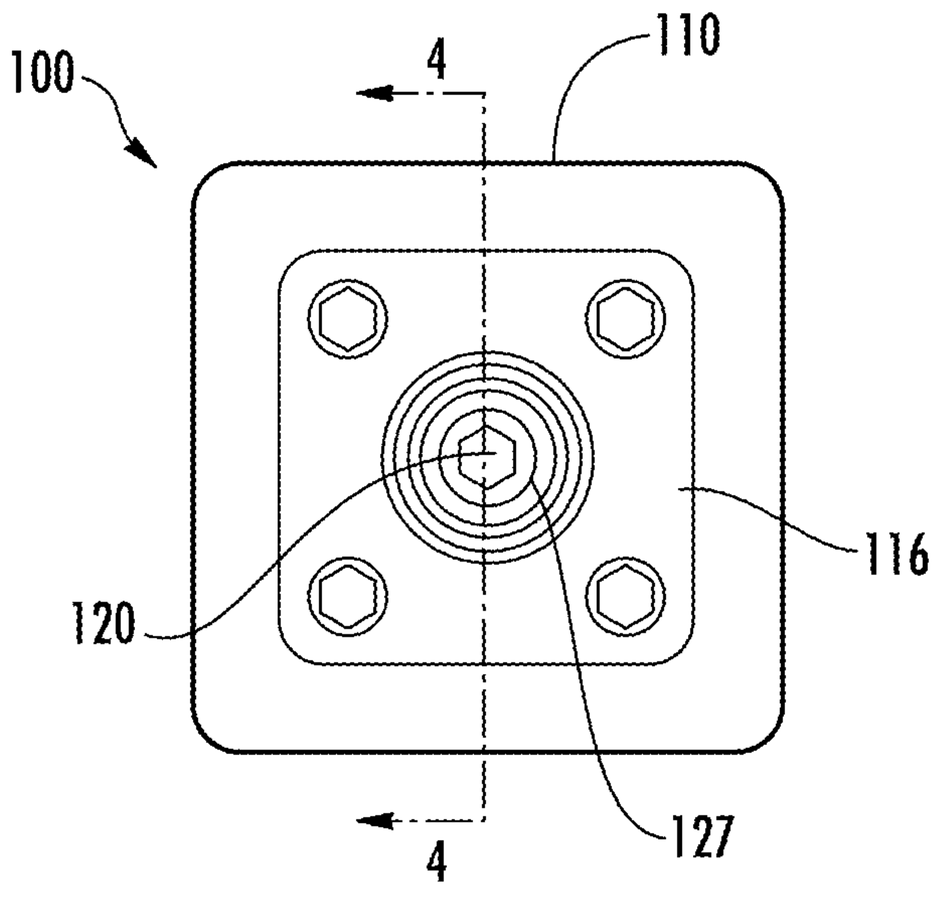


FIG. 3

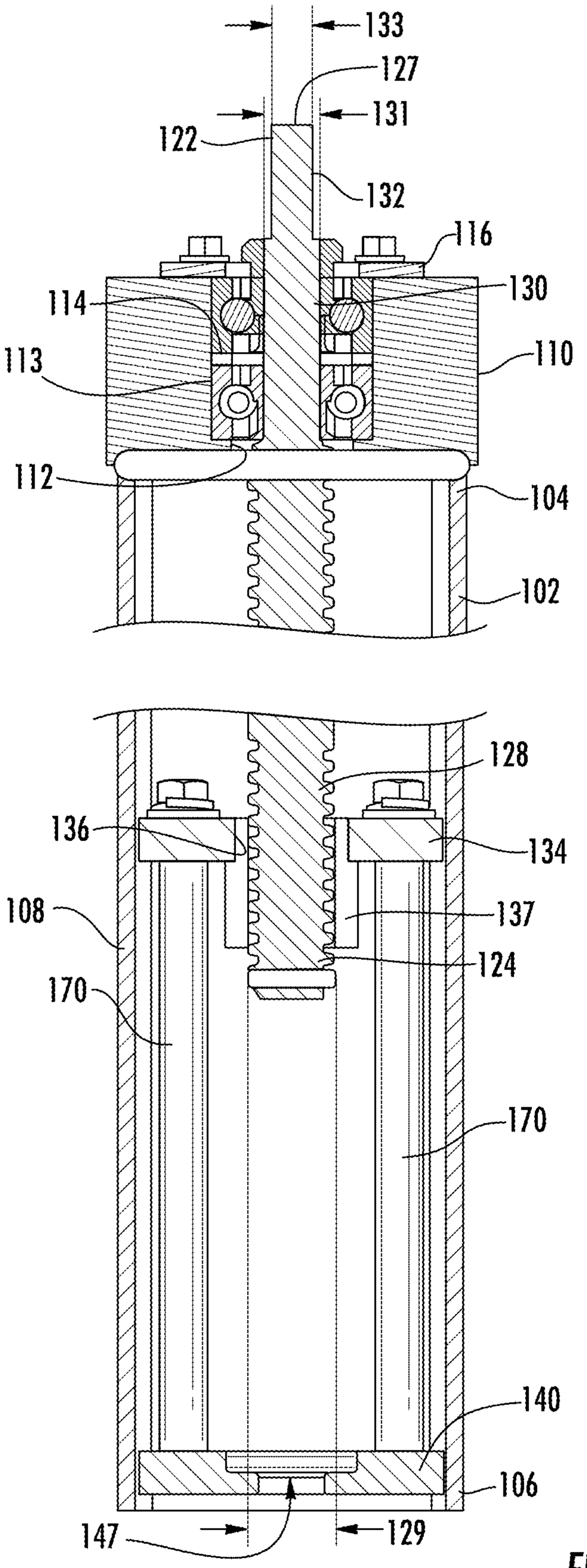

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FIG. 4

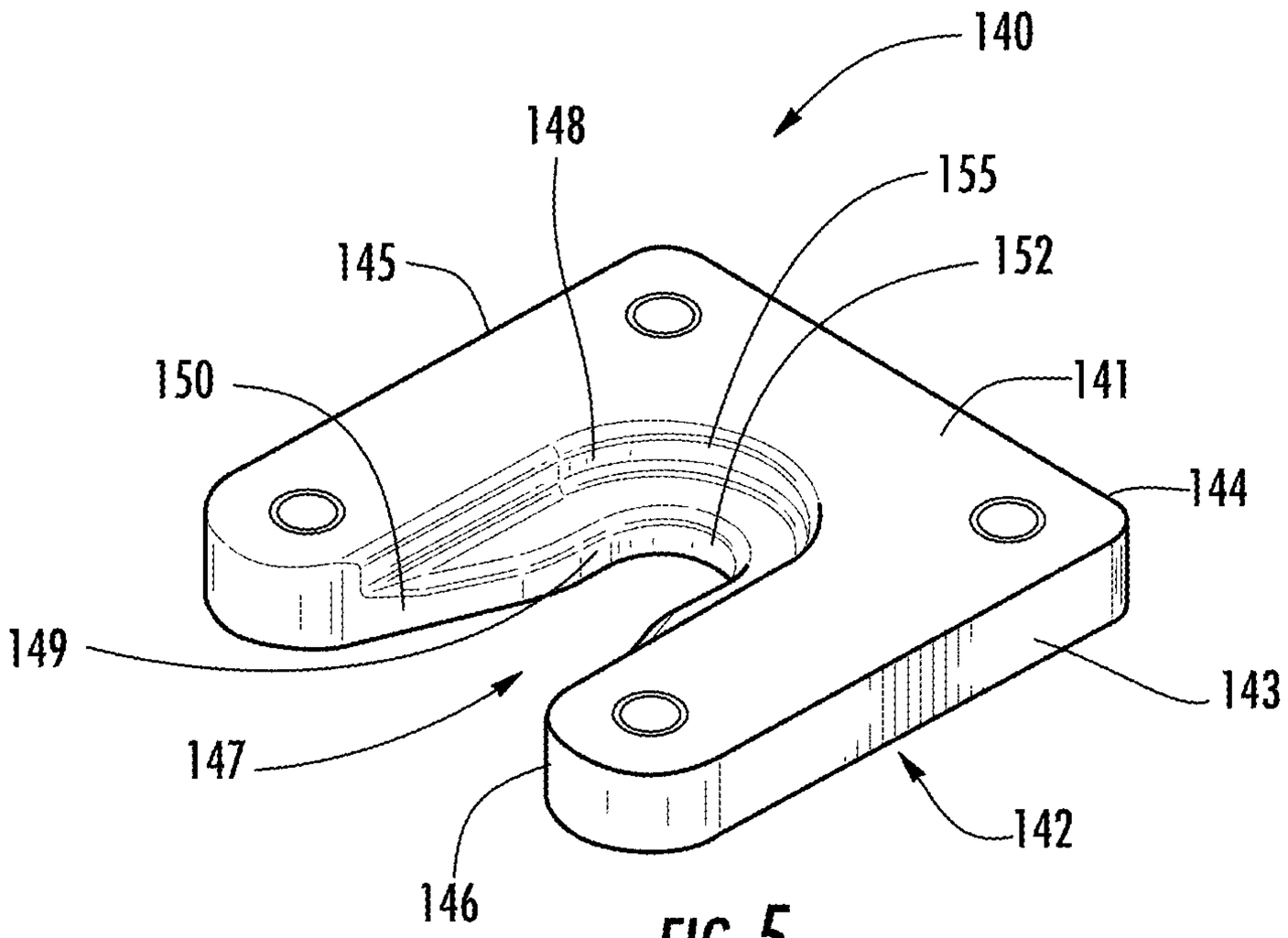
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FIG. 5

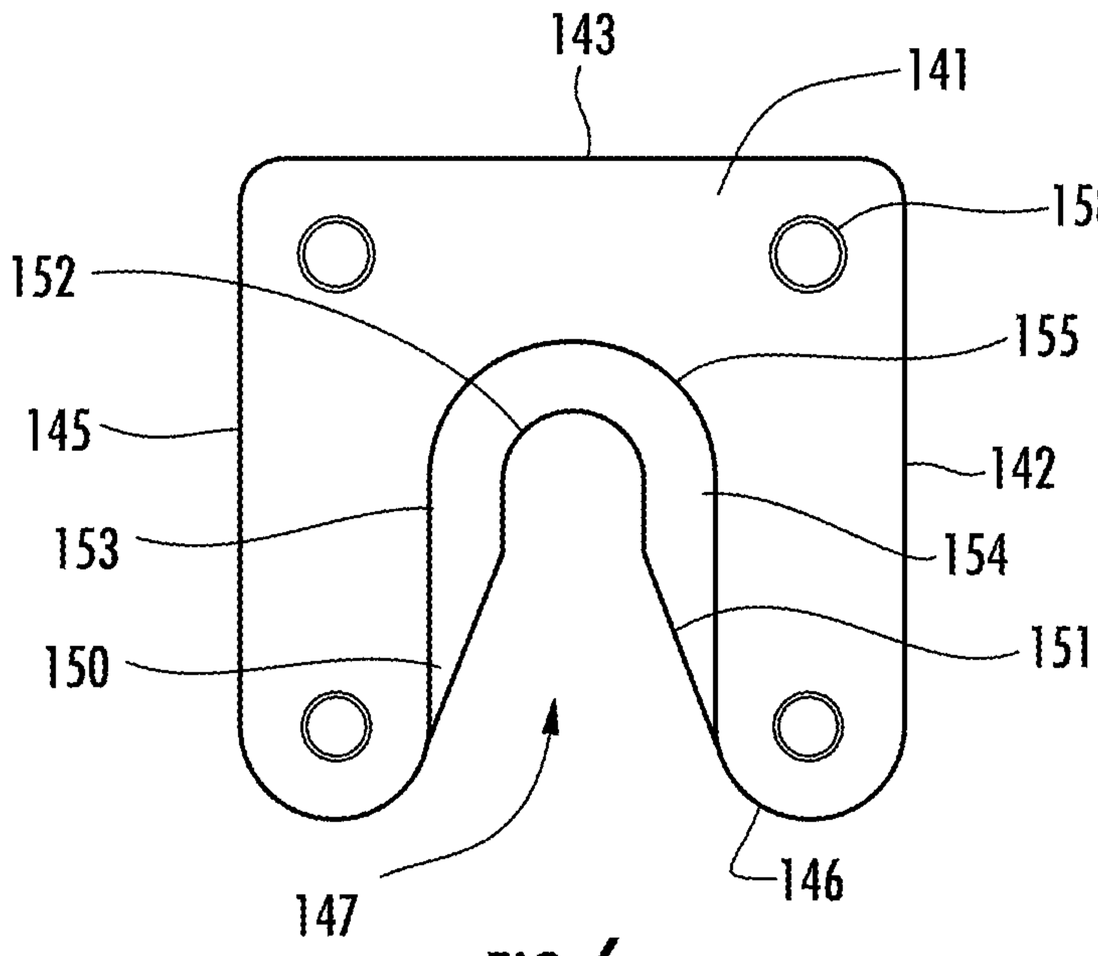
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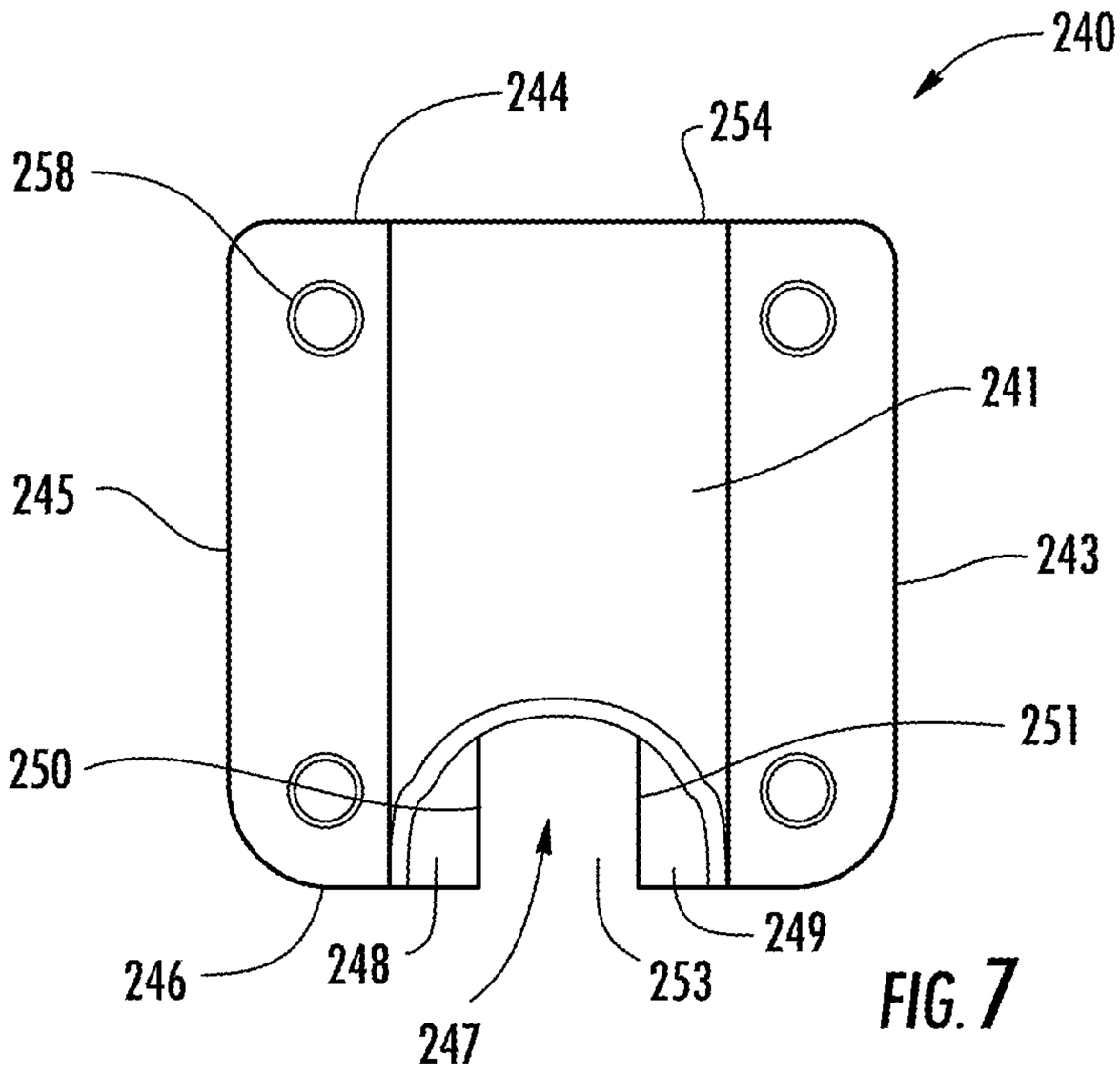
FIG. 6



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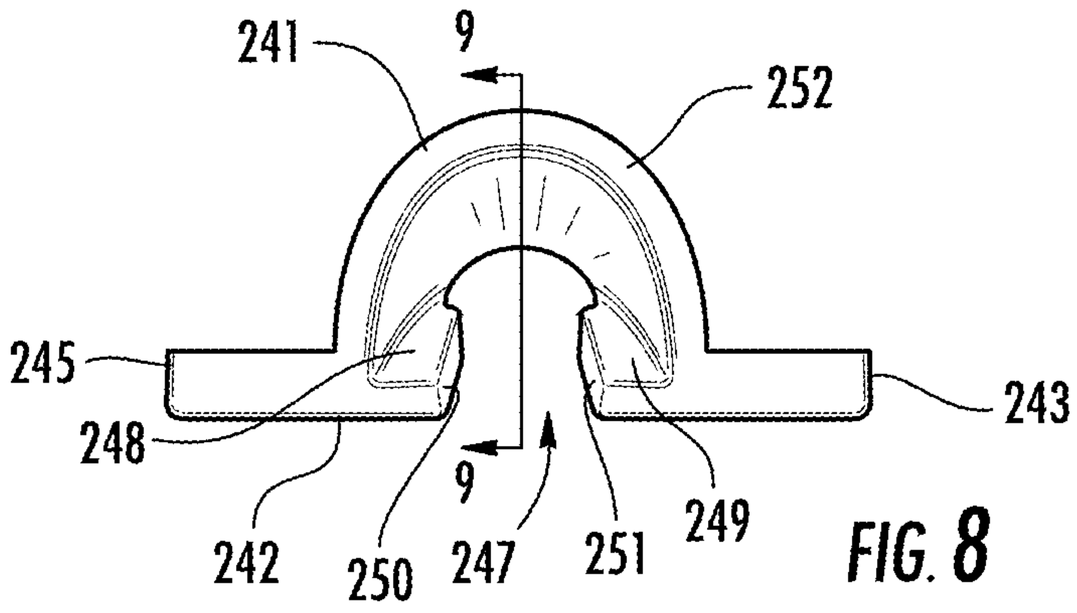
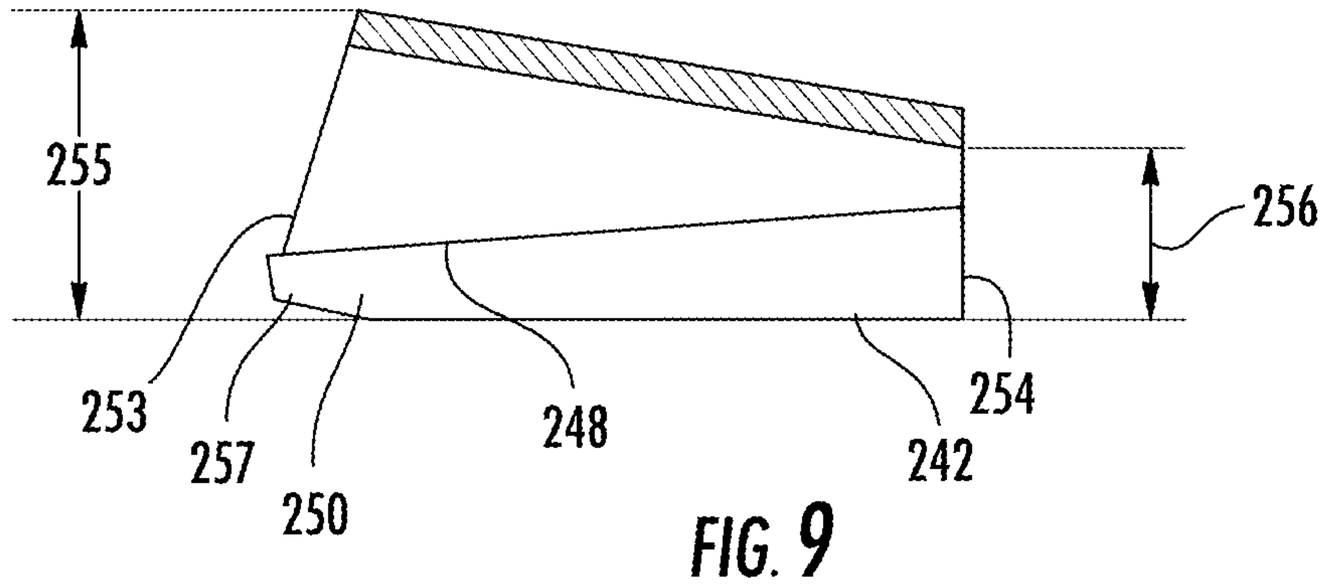


FIG. 8



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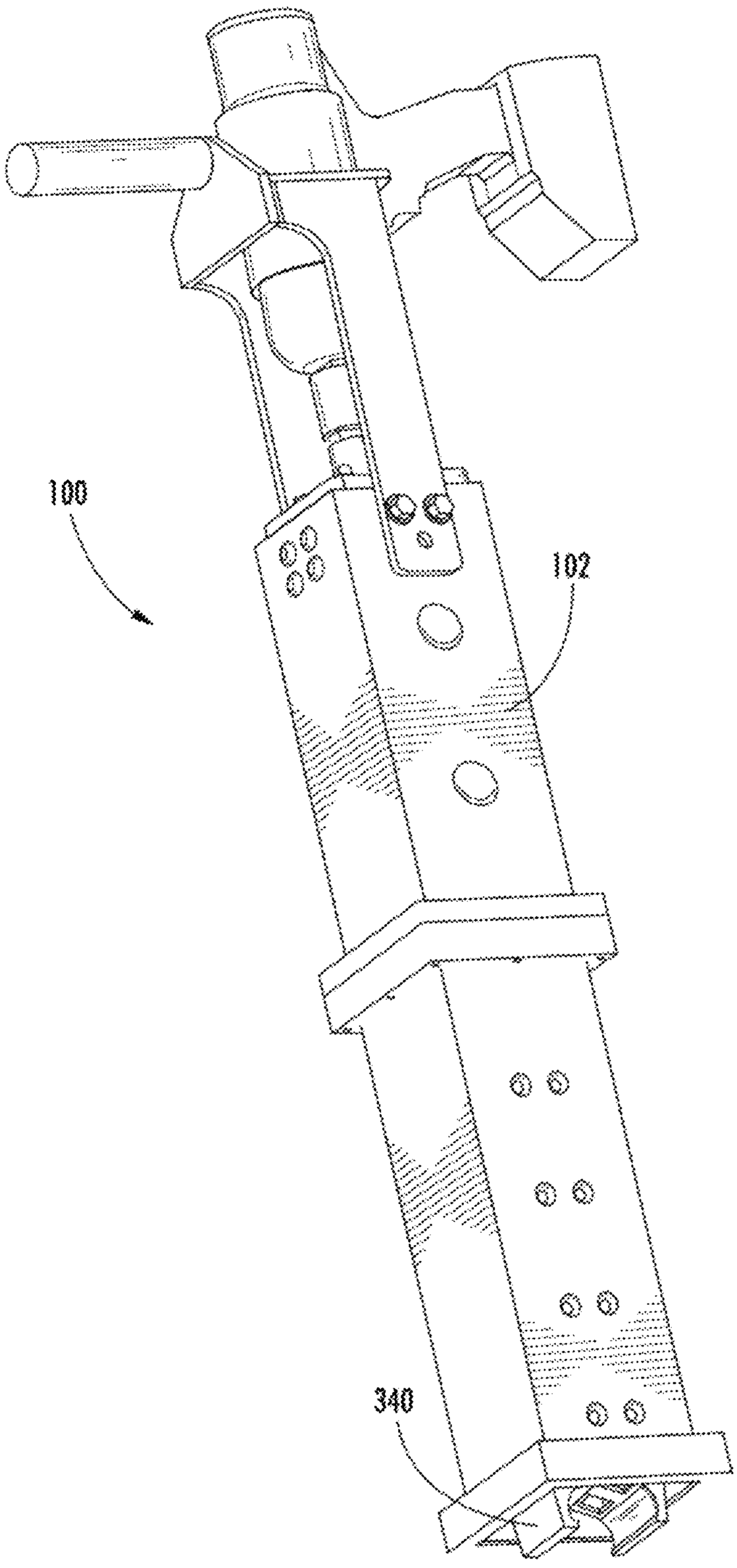

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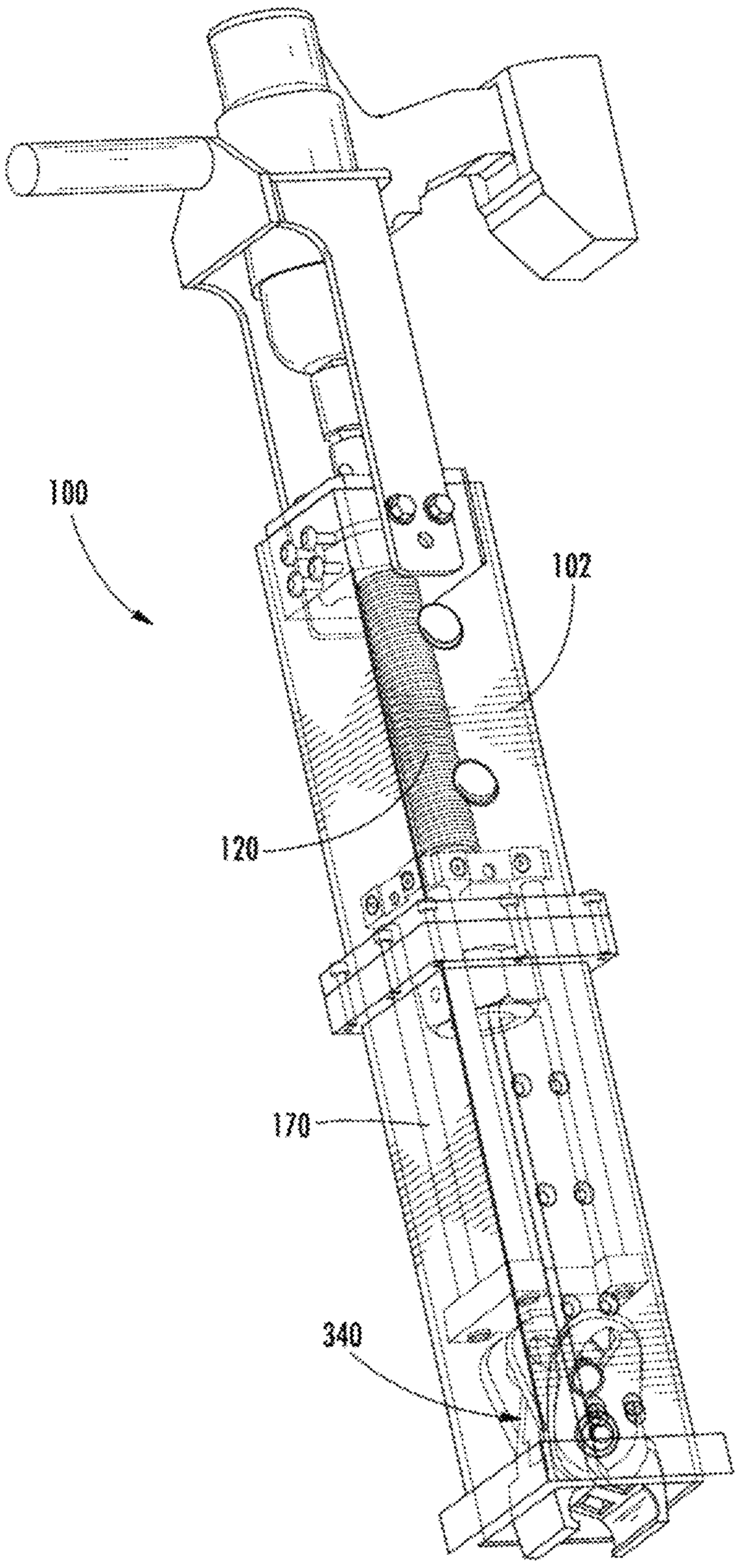

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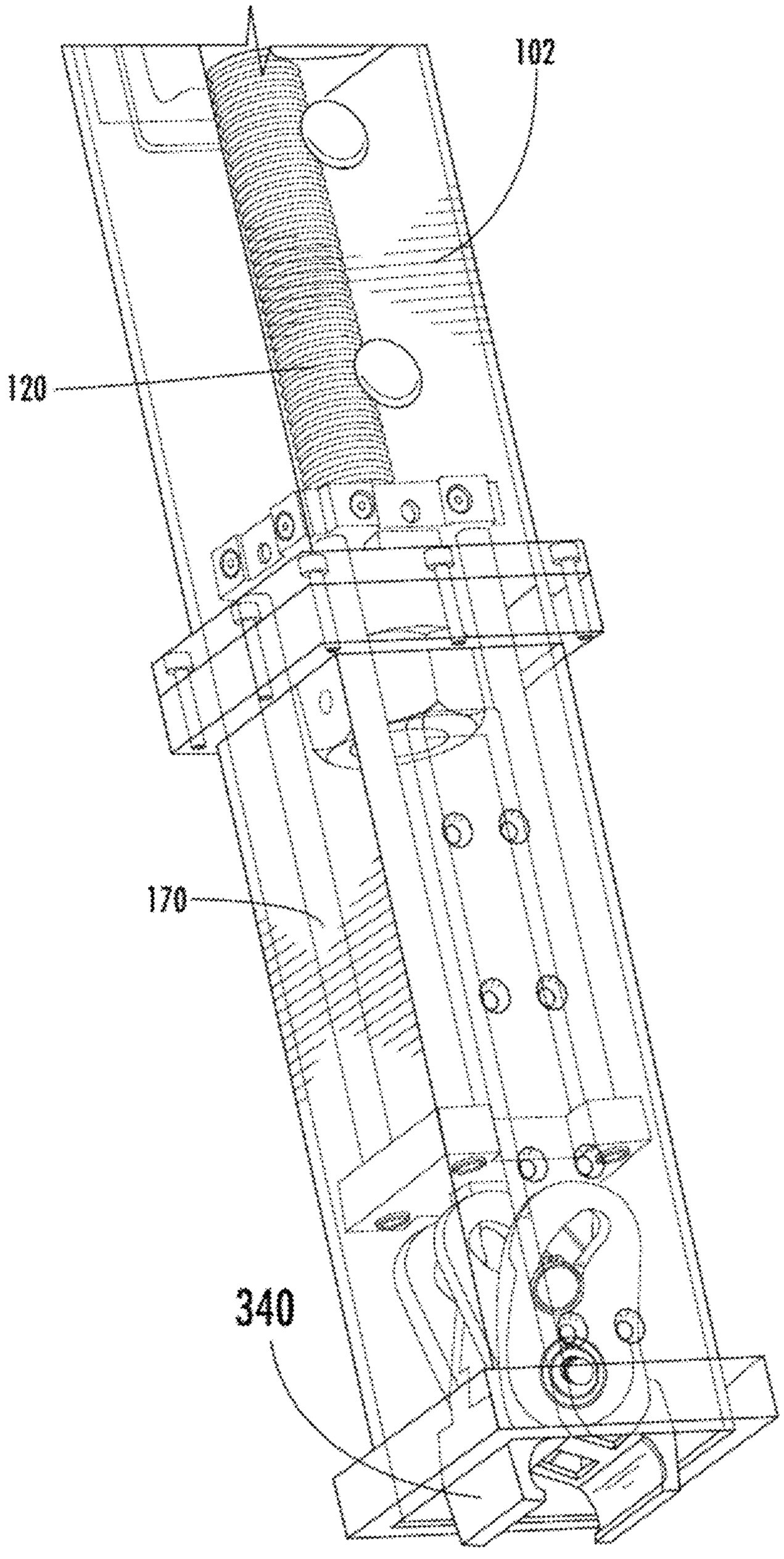
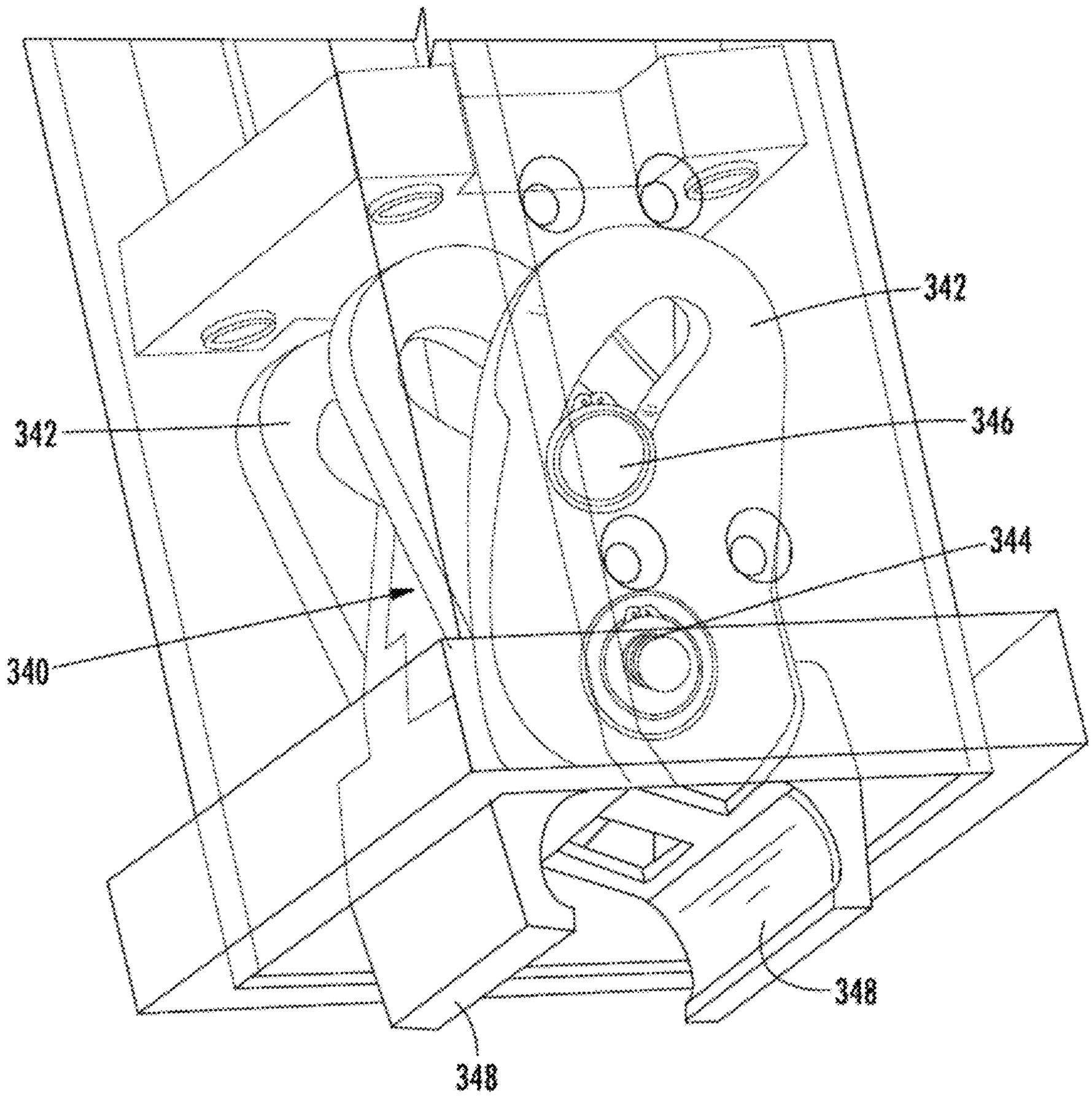


FIG. 12



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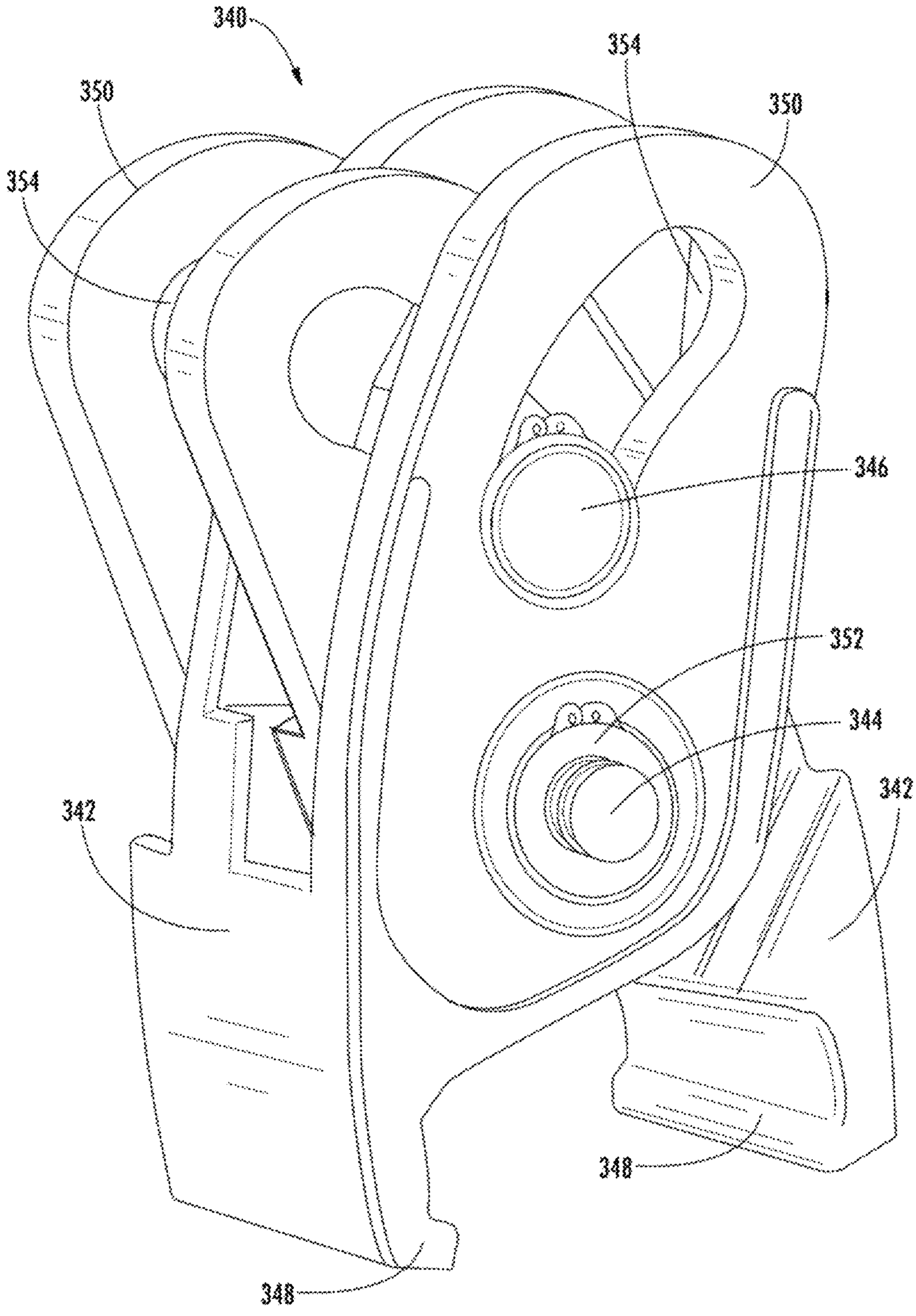

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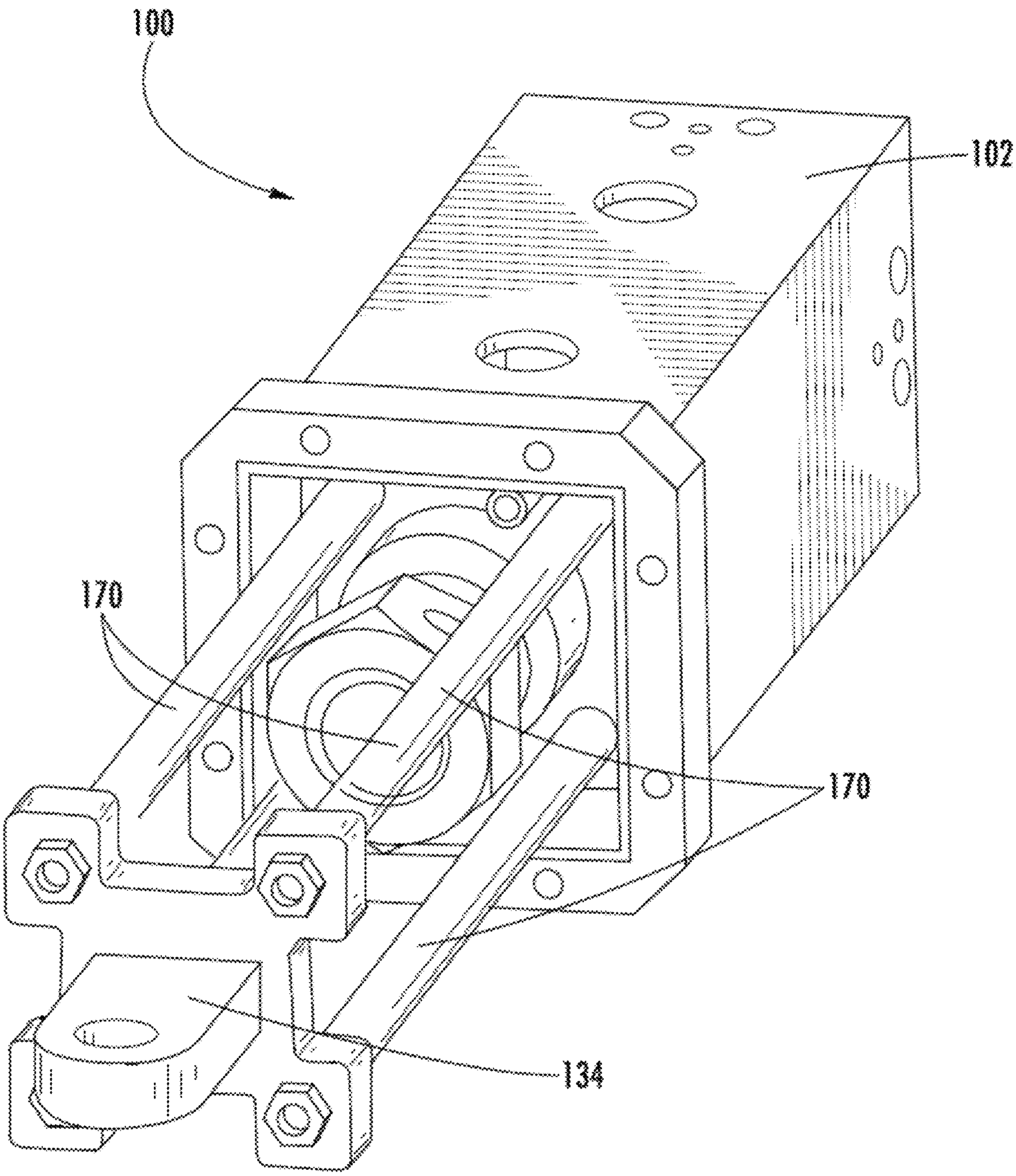


FIG. 15A

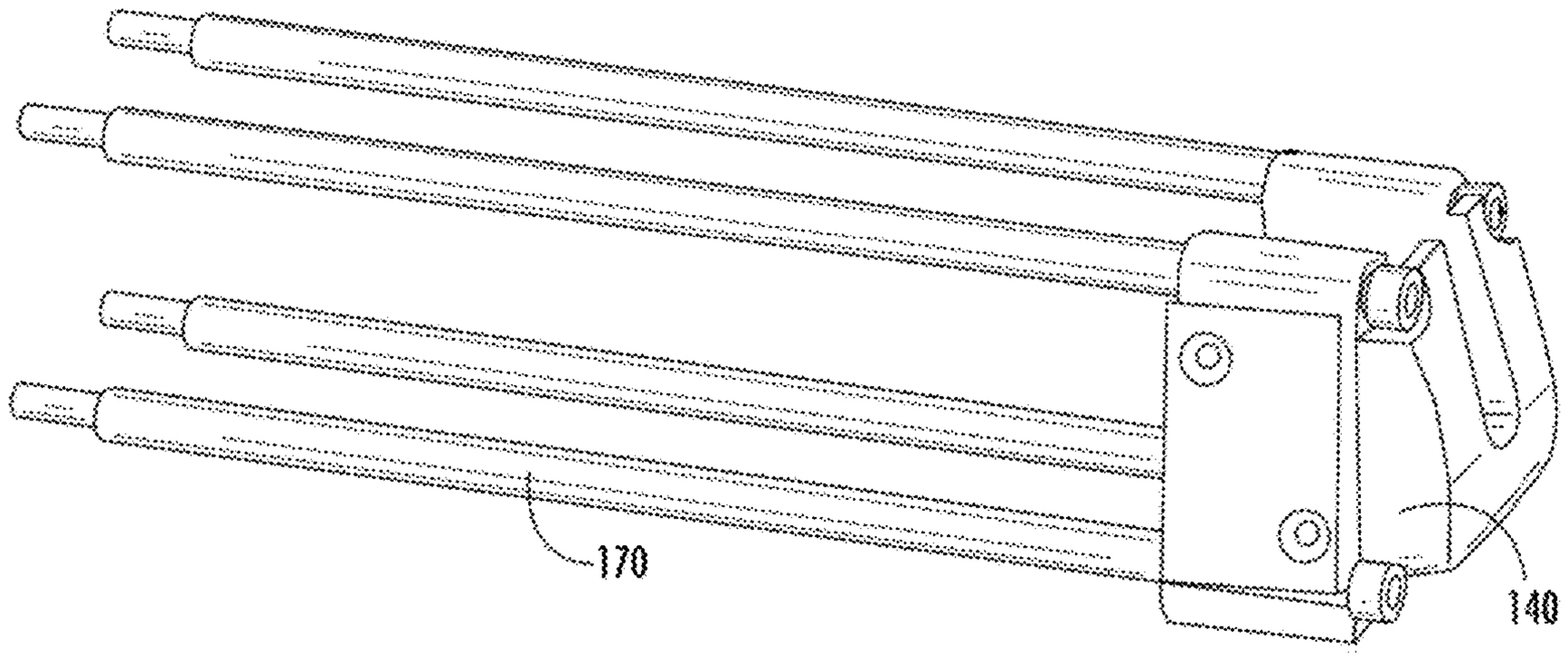


FIG. 15B

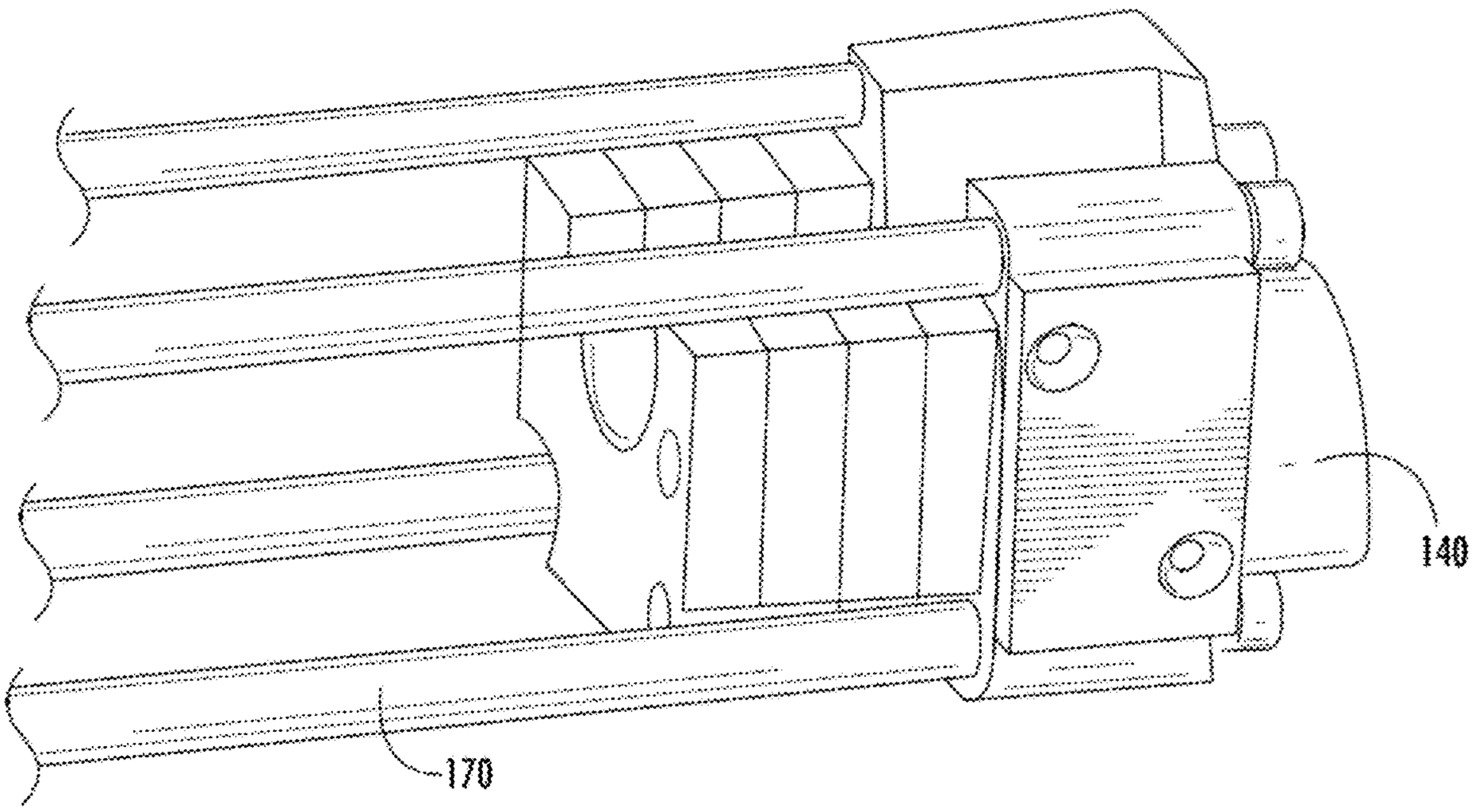


FIG. 15C

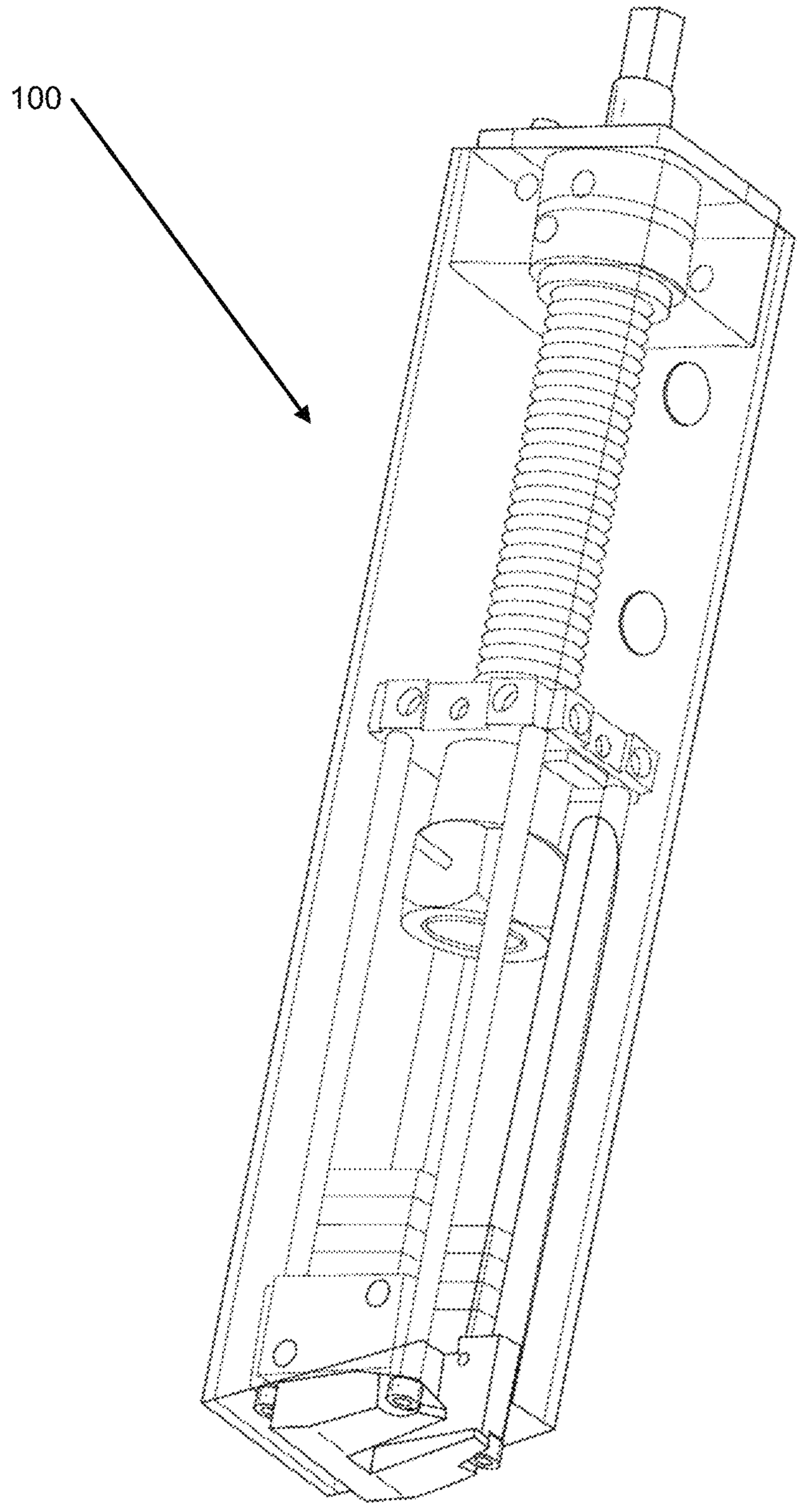


FIG. 15D

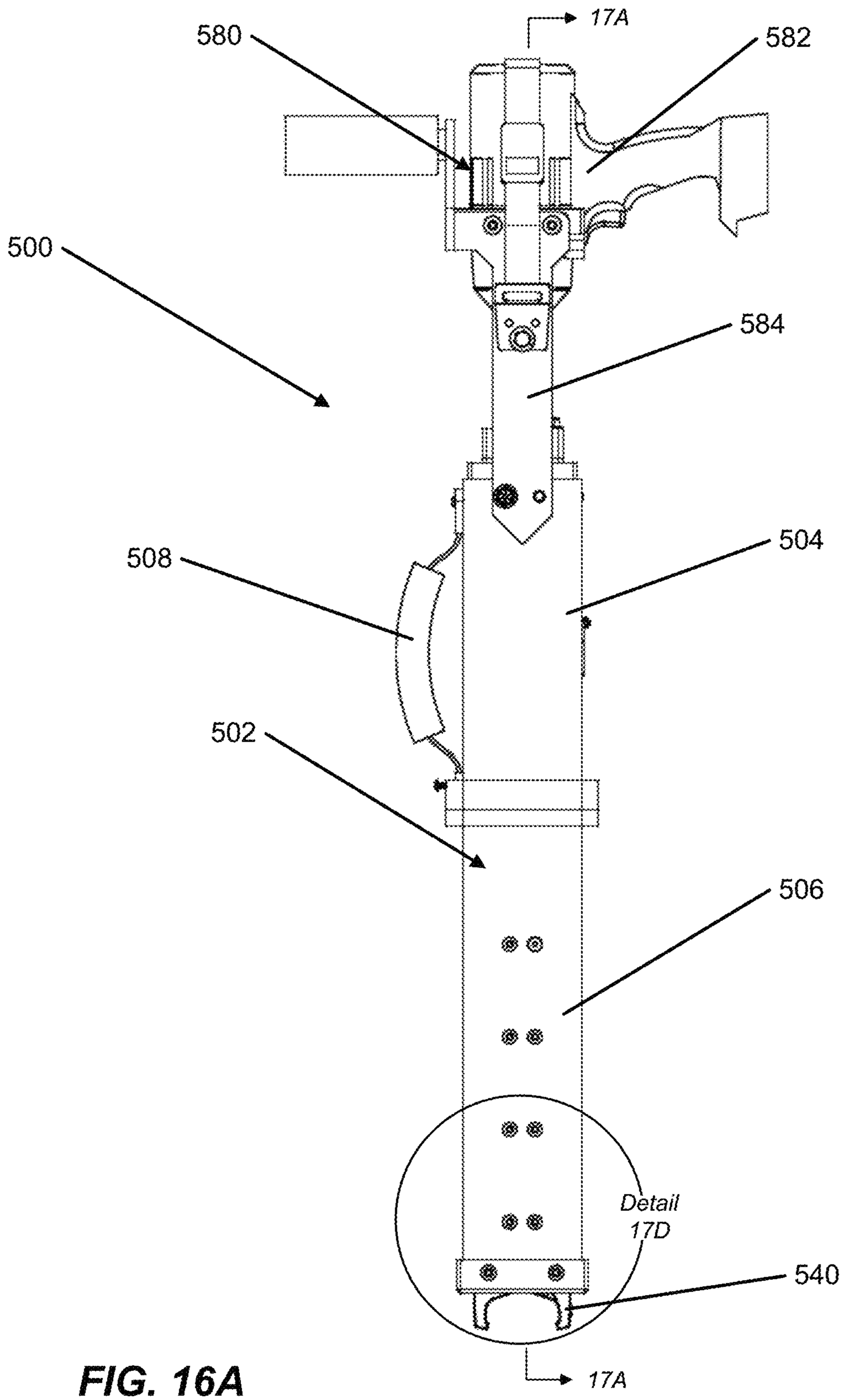


FIG. 16A

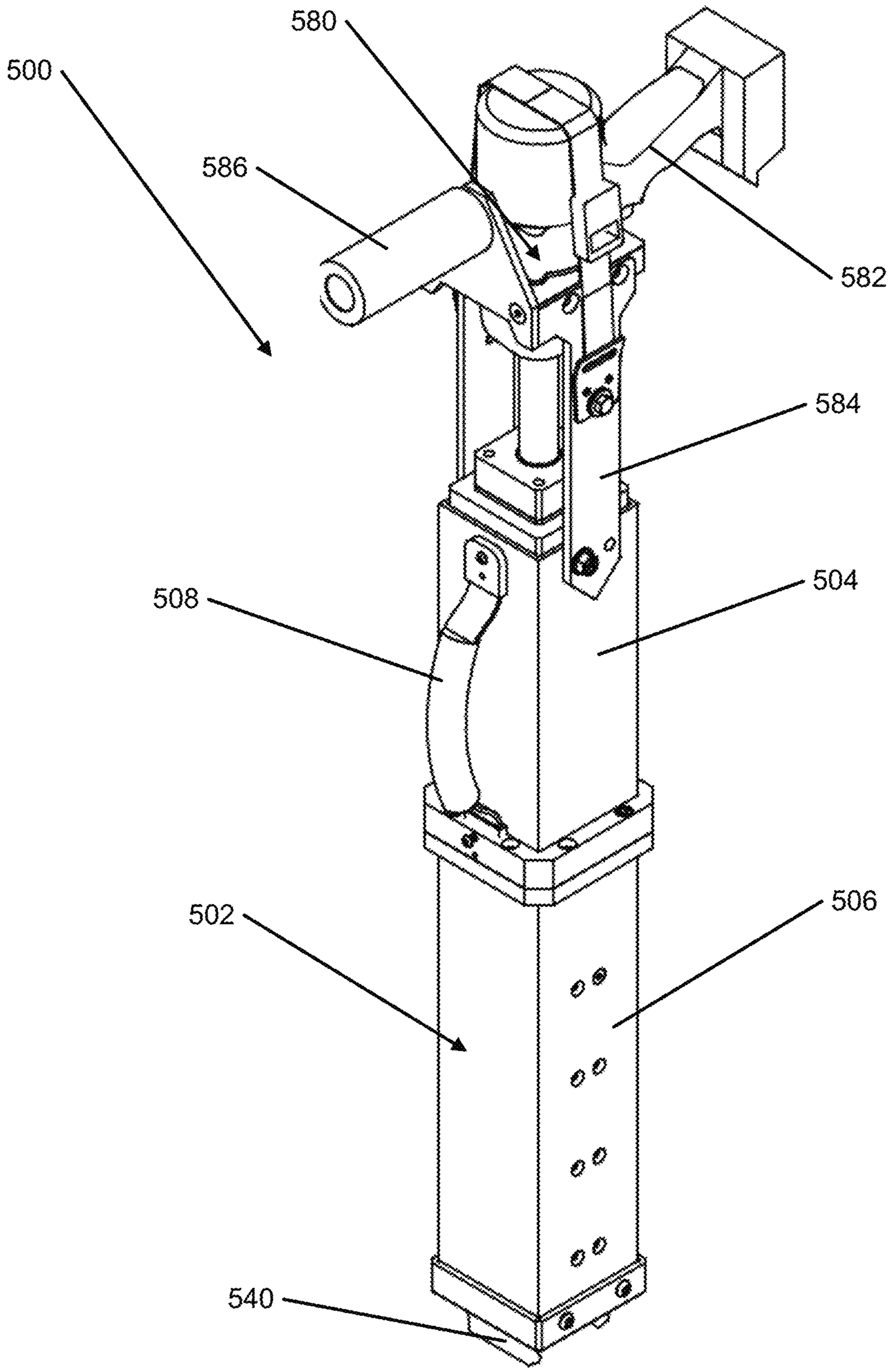
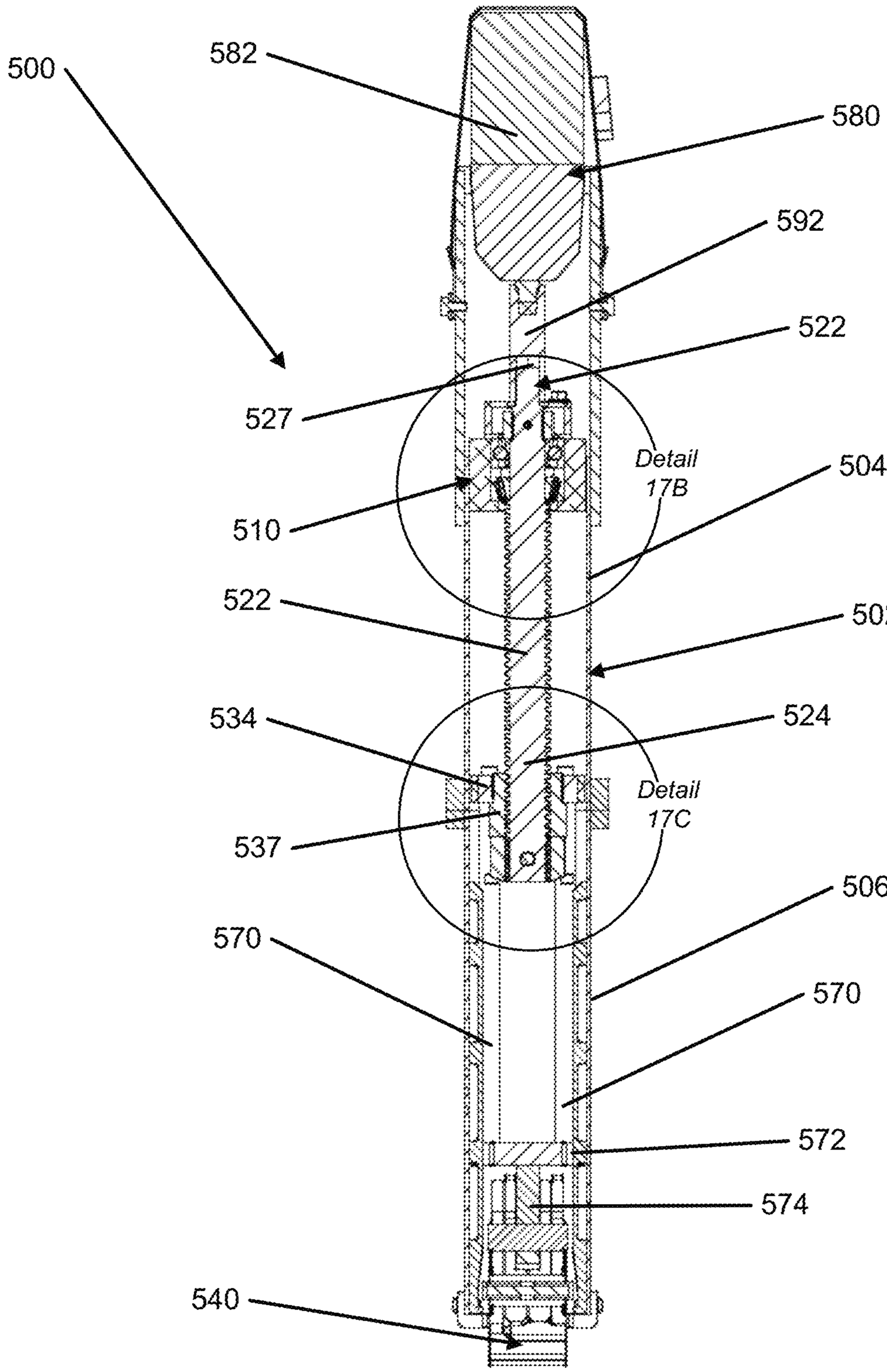


FIG. 16B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Detail 17B
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Detail 17C
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FIG. 17A

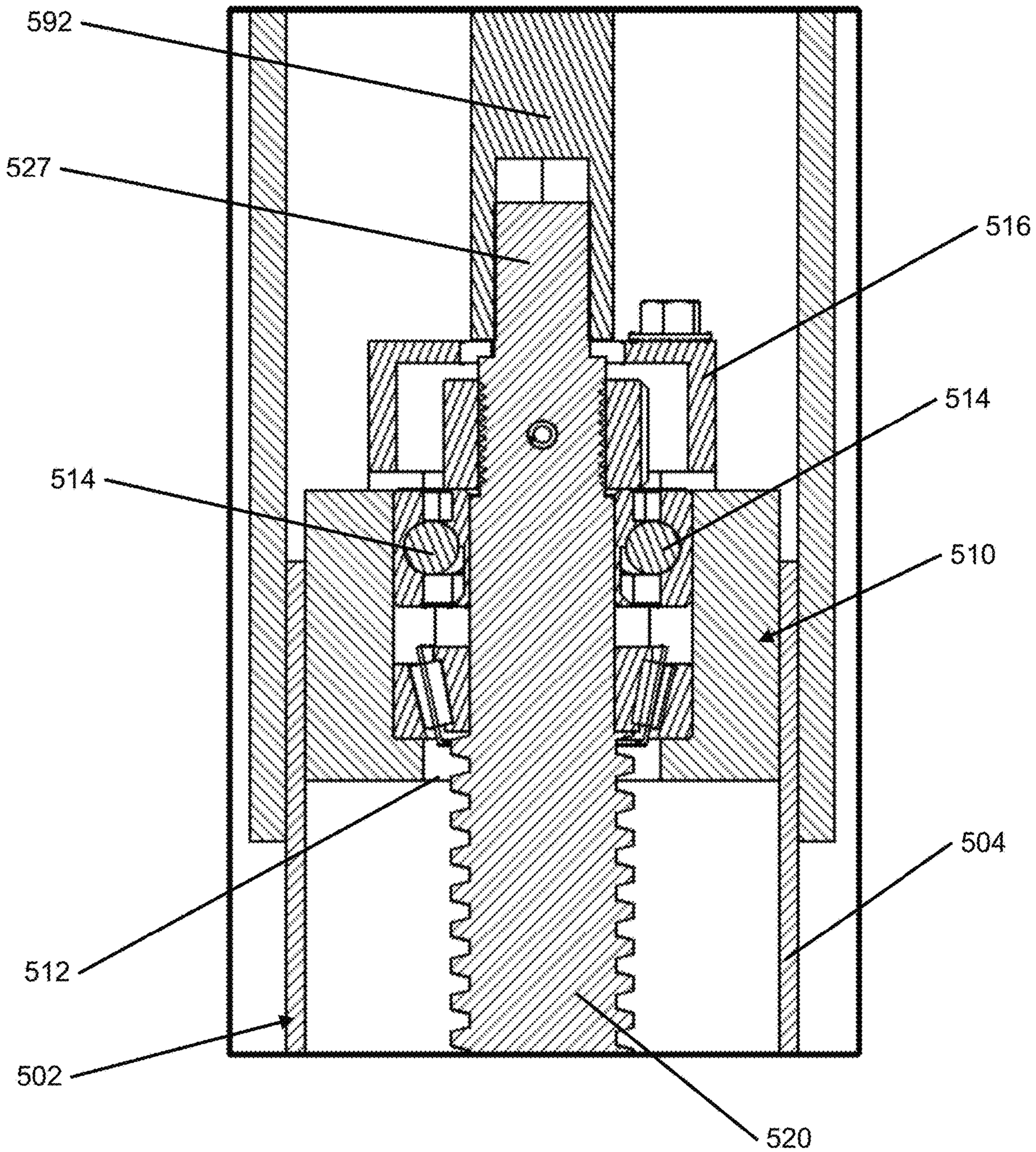

FIG. 17B

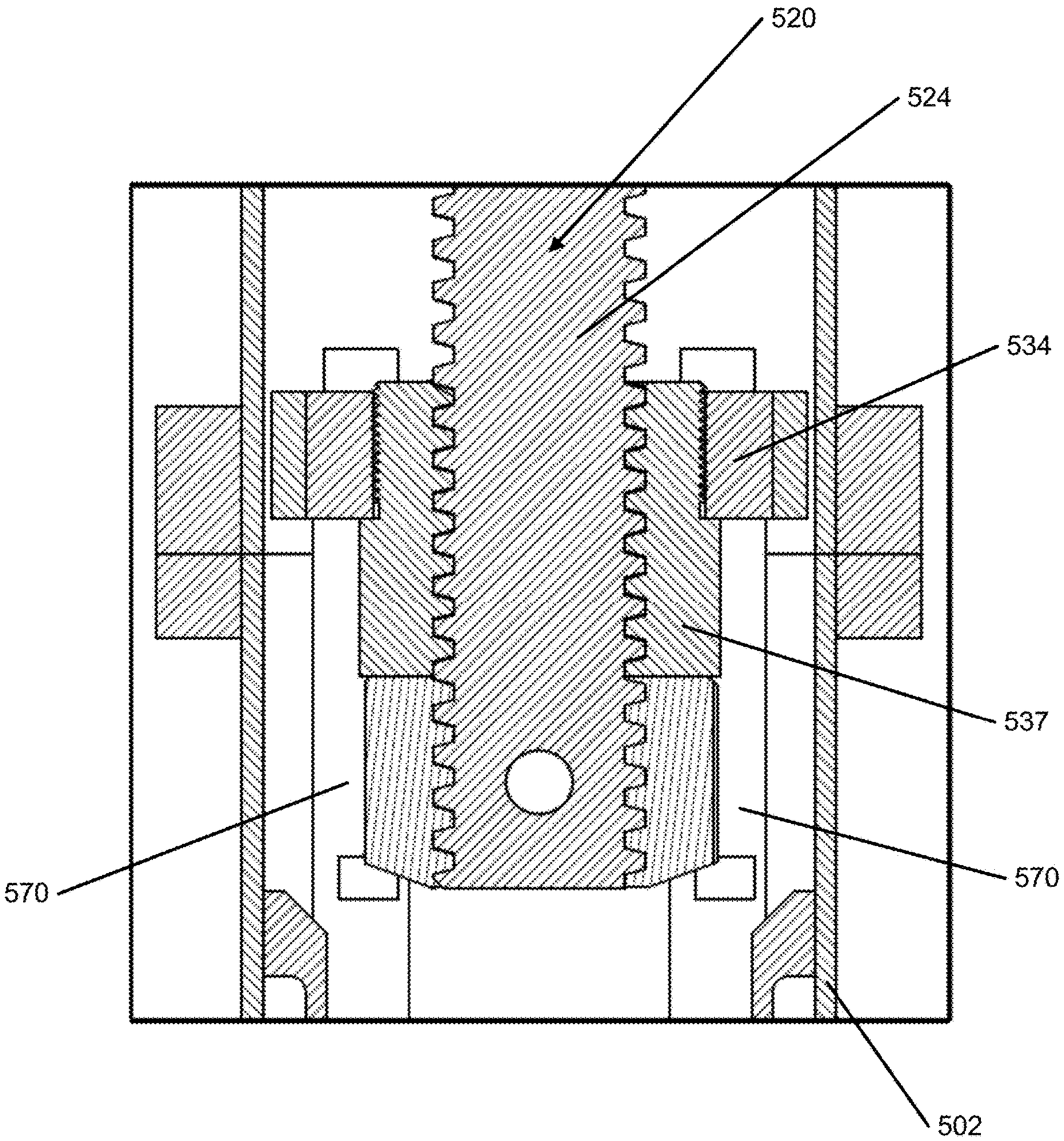

FIG. 17C

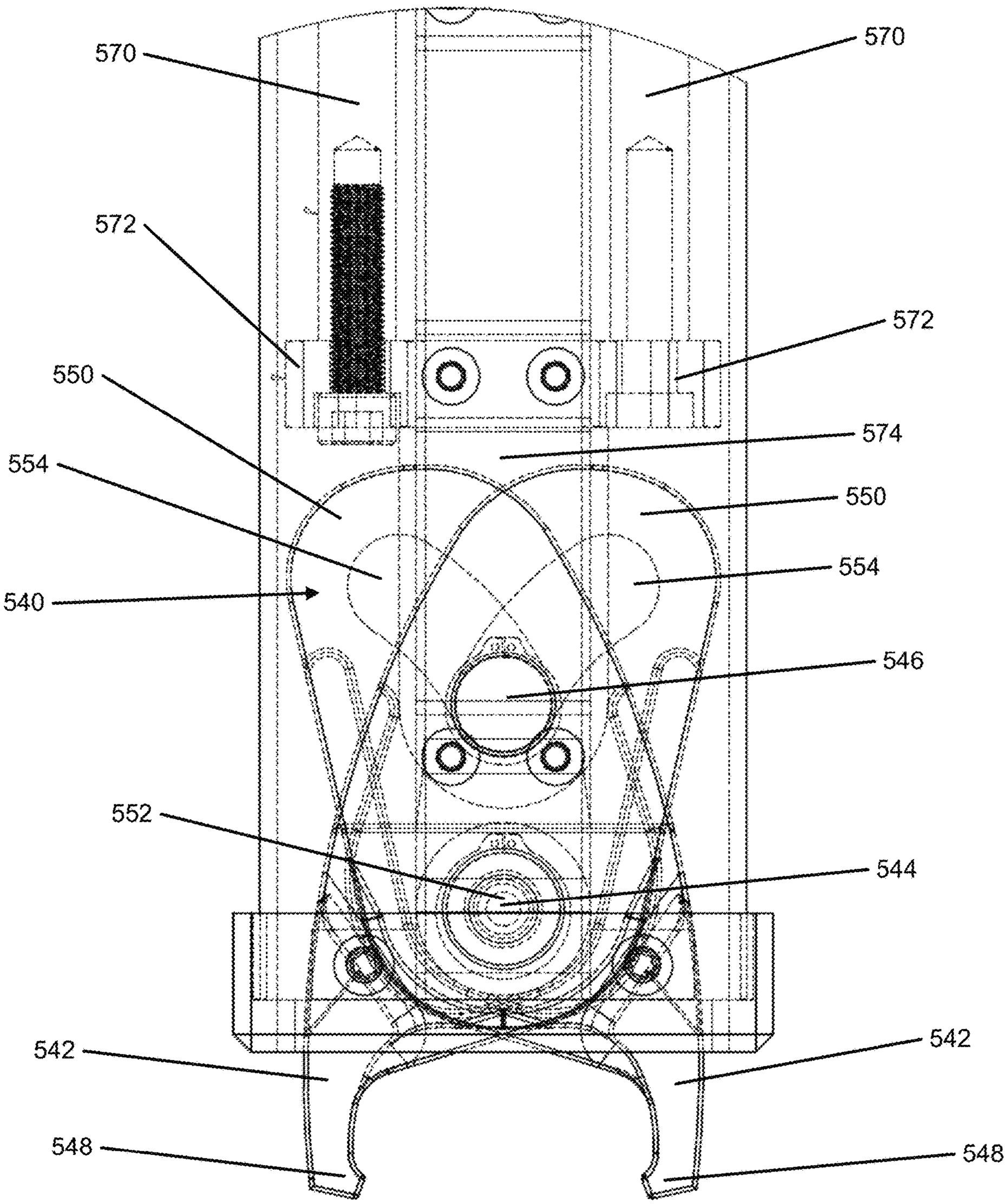
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FIG. 17D

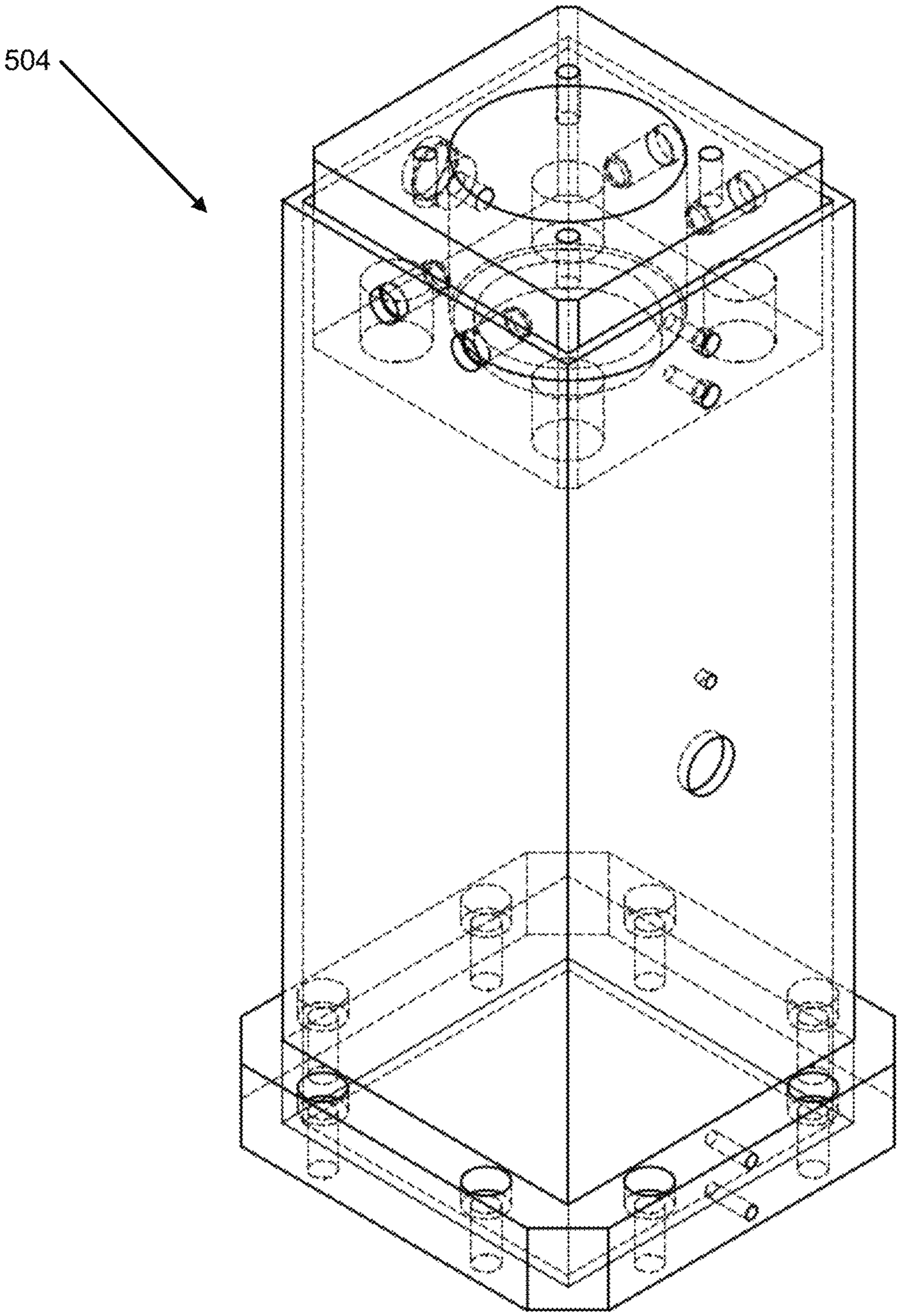

FIG. 18A

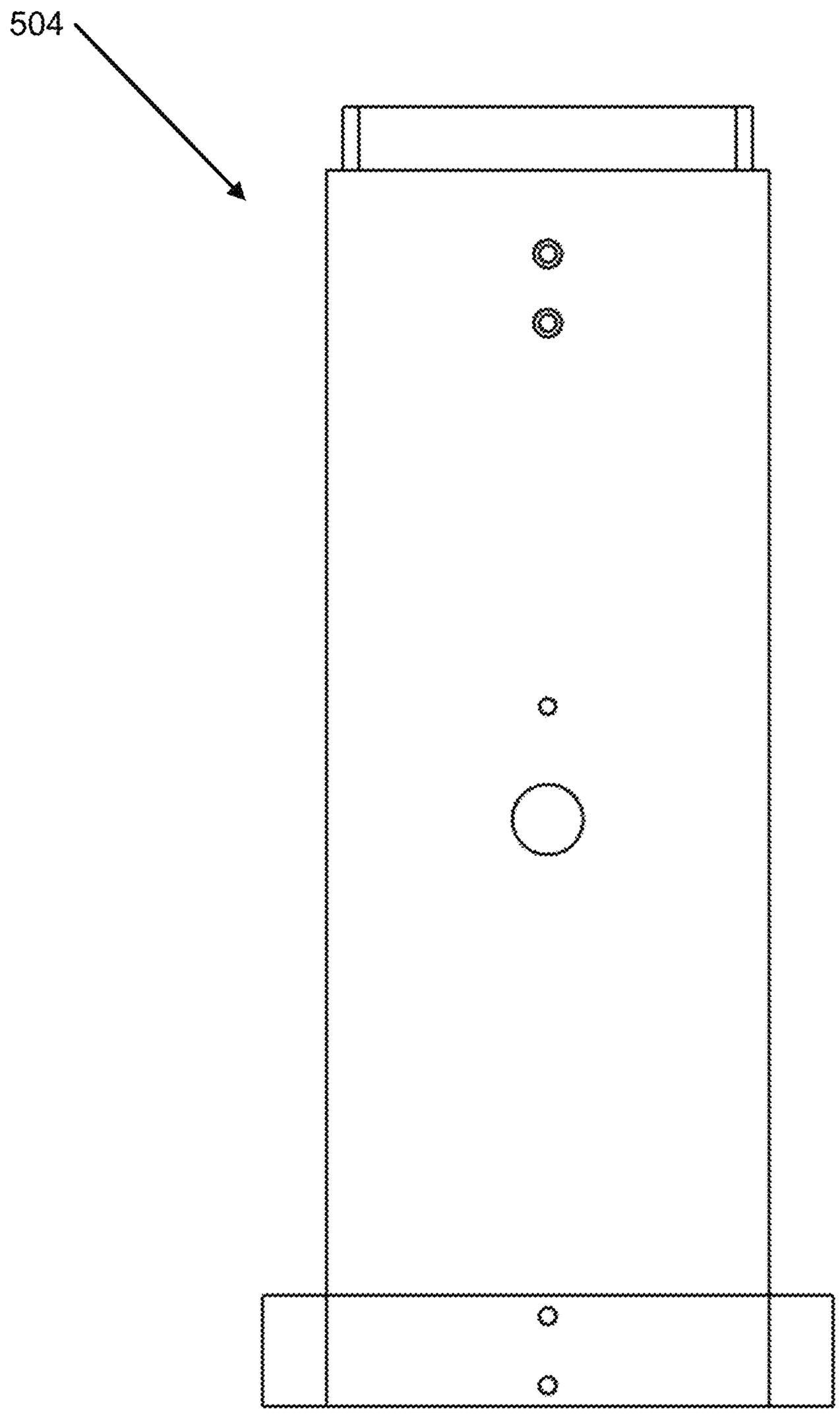

FIG. 18B

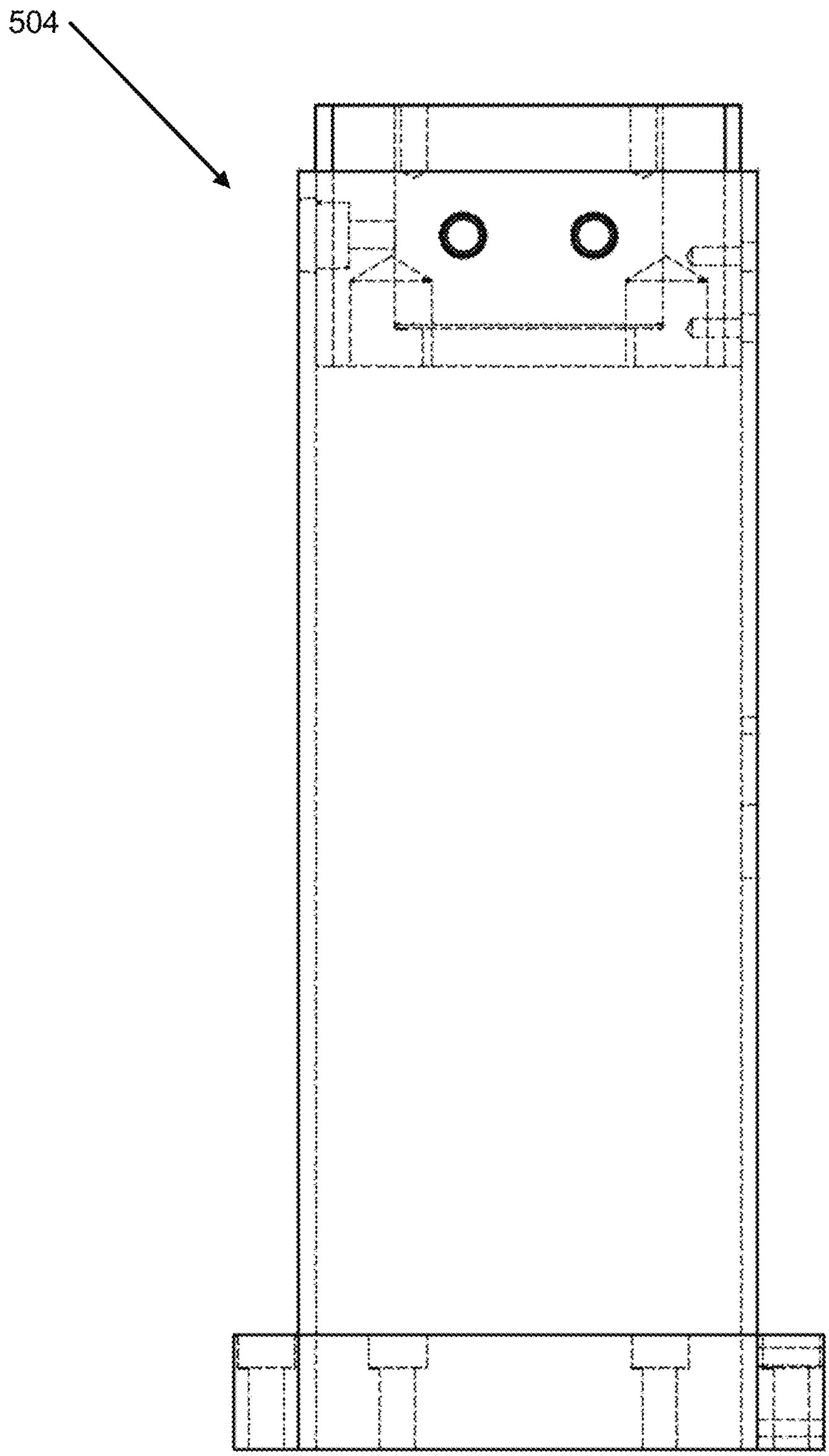

FIG. 18C

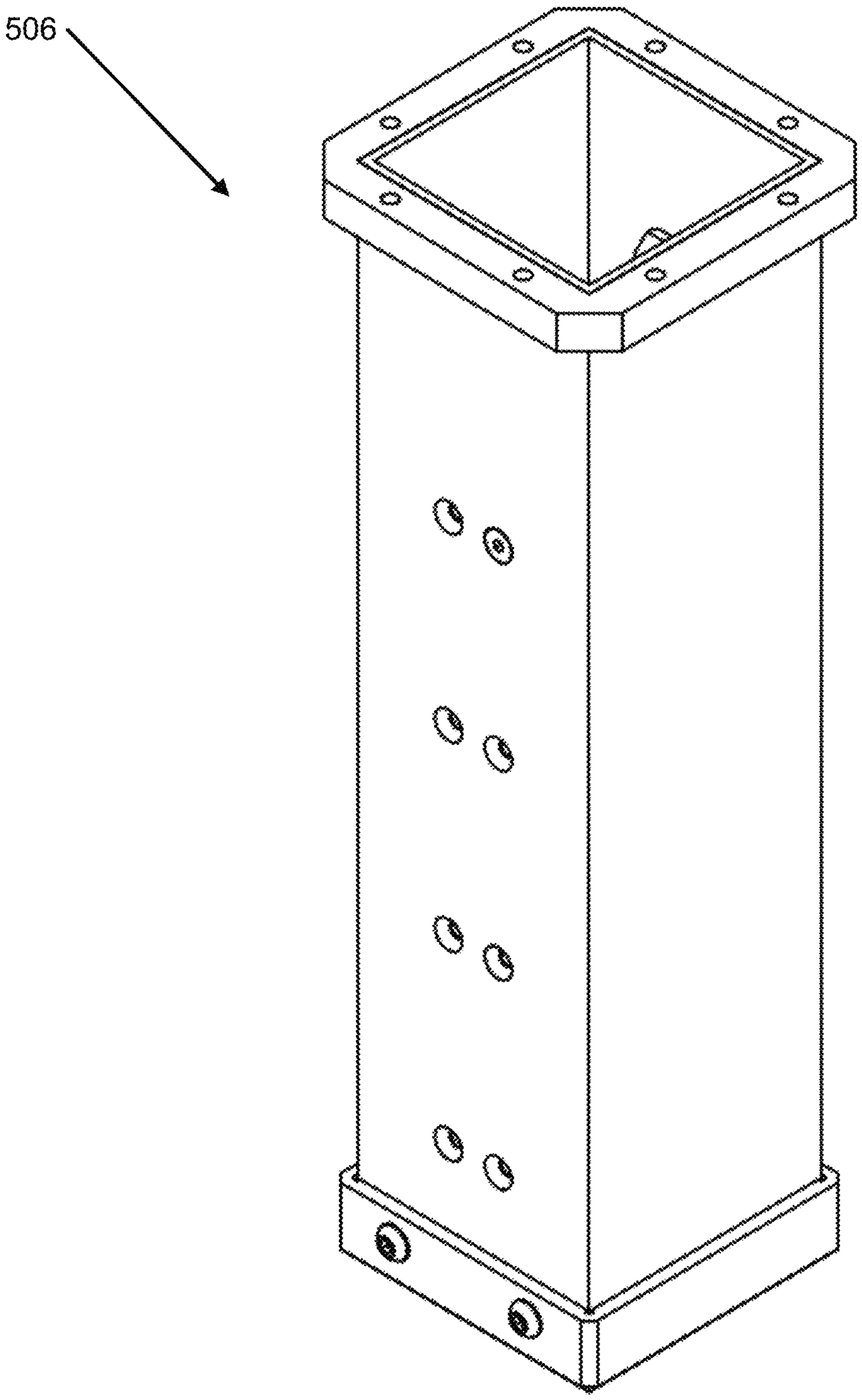

FIG. 19A

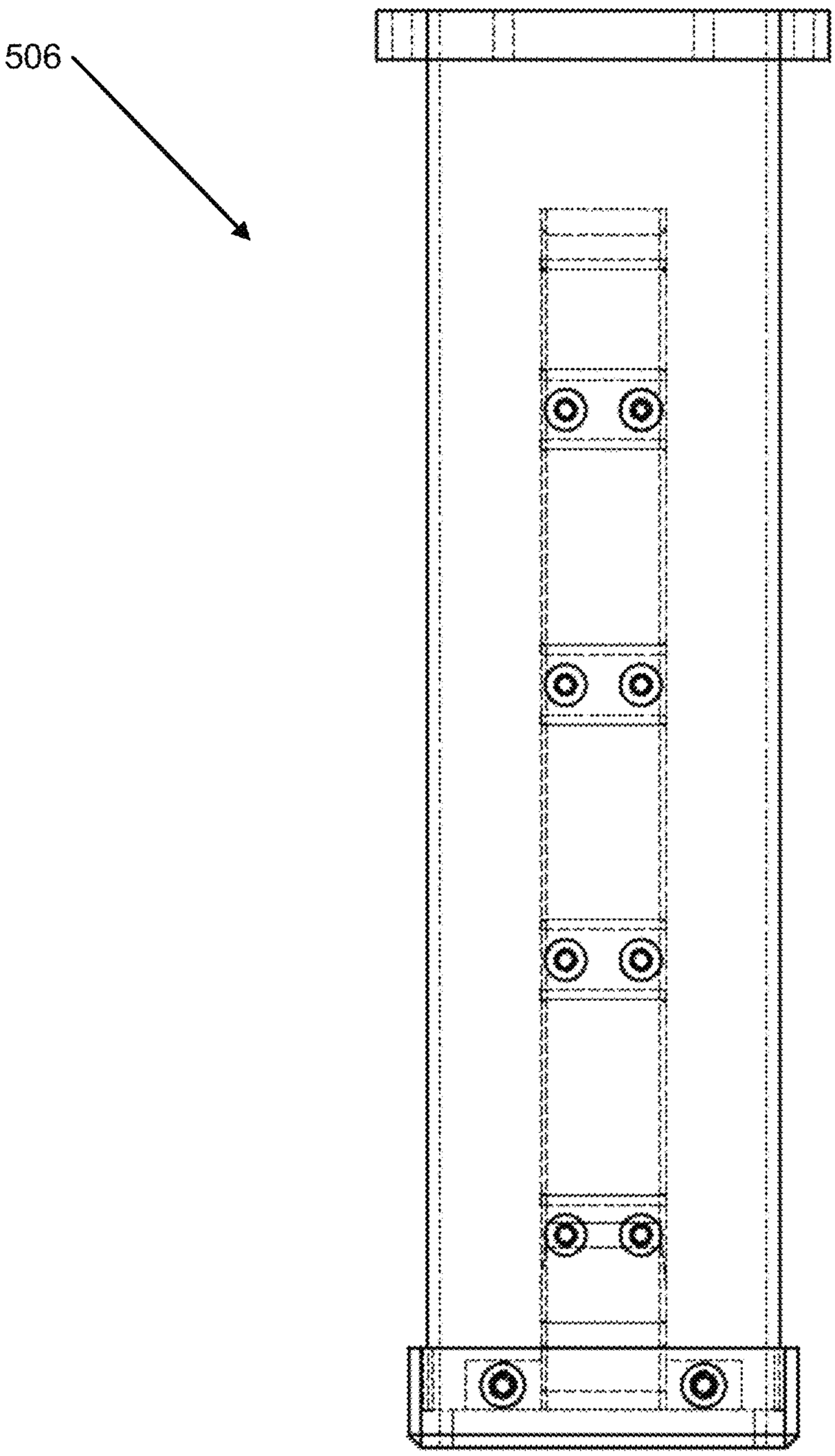

FIG. 19B

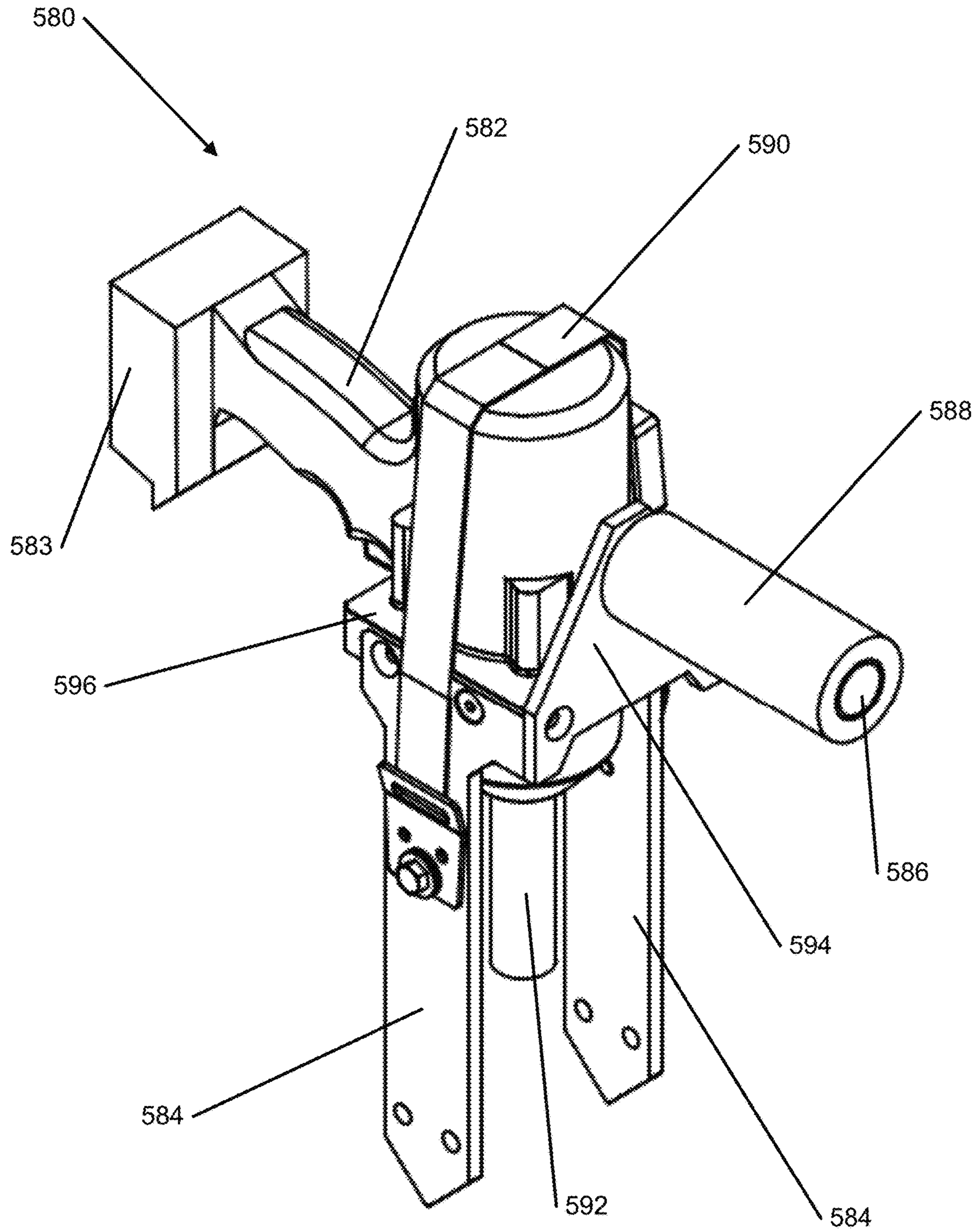

FIG. 20A

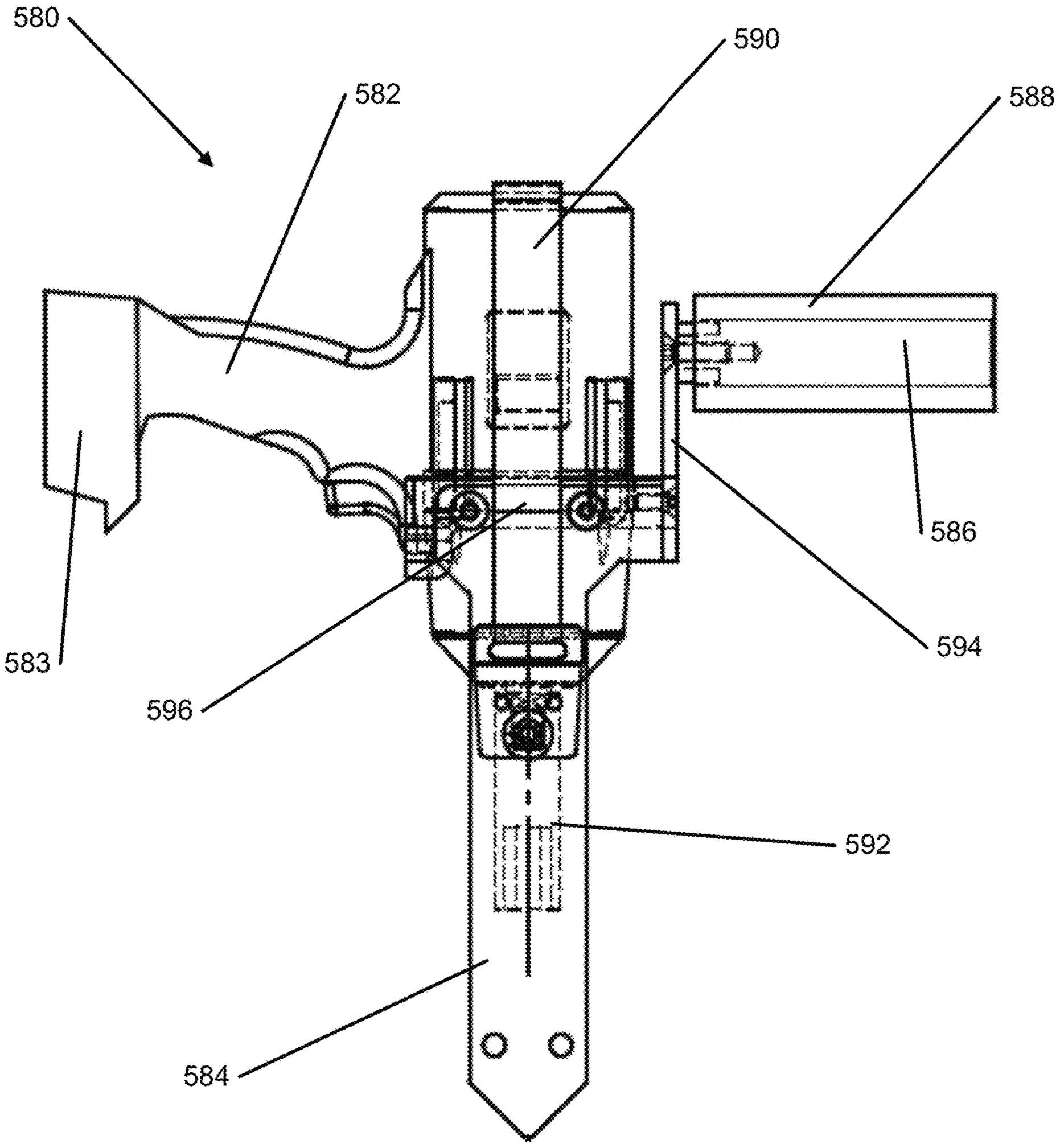

FIG. 20B

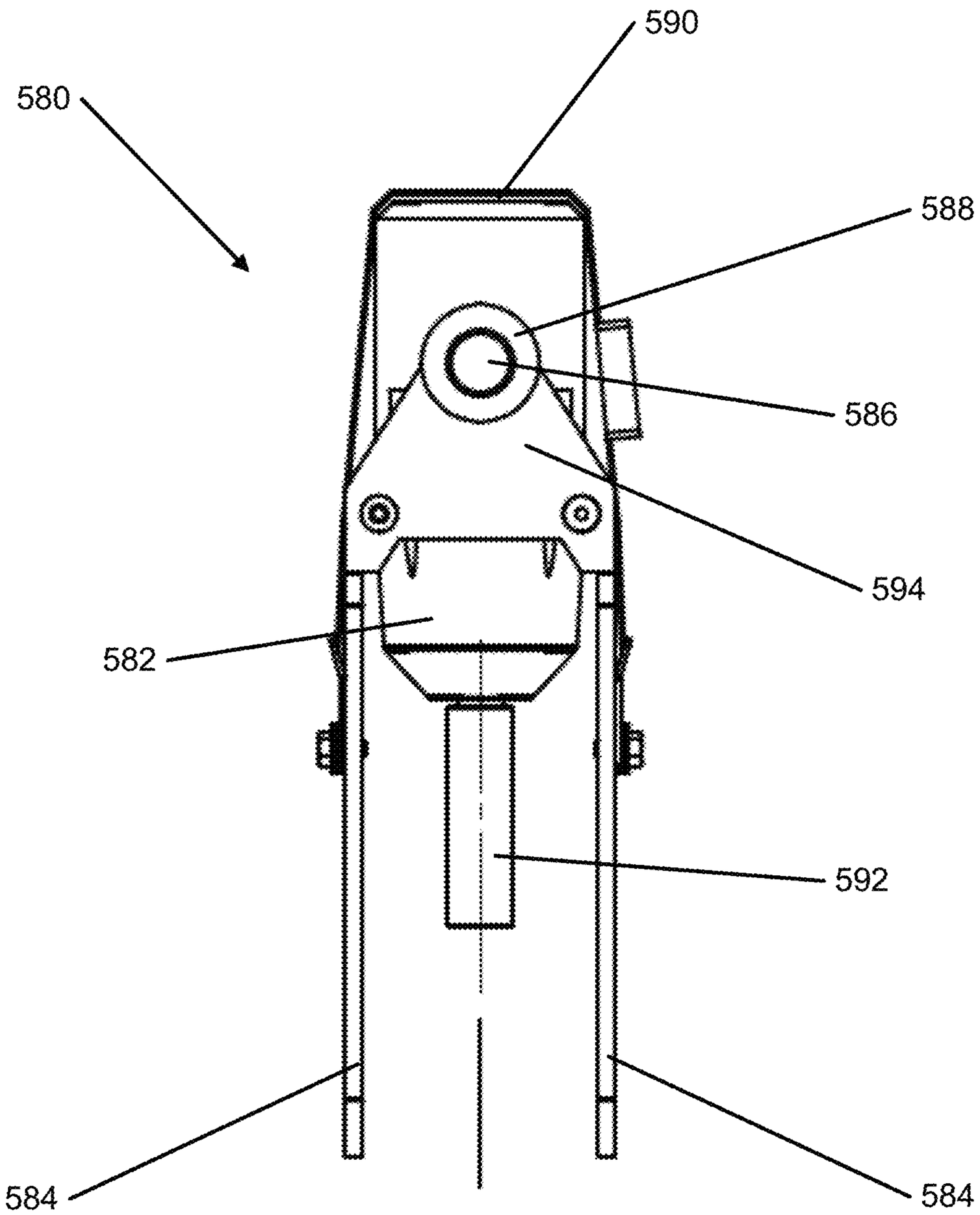

FIG. 20C

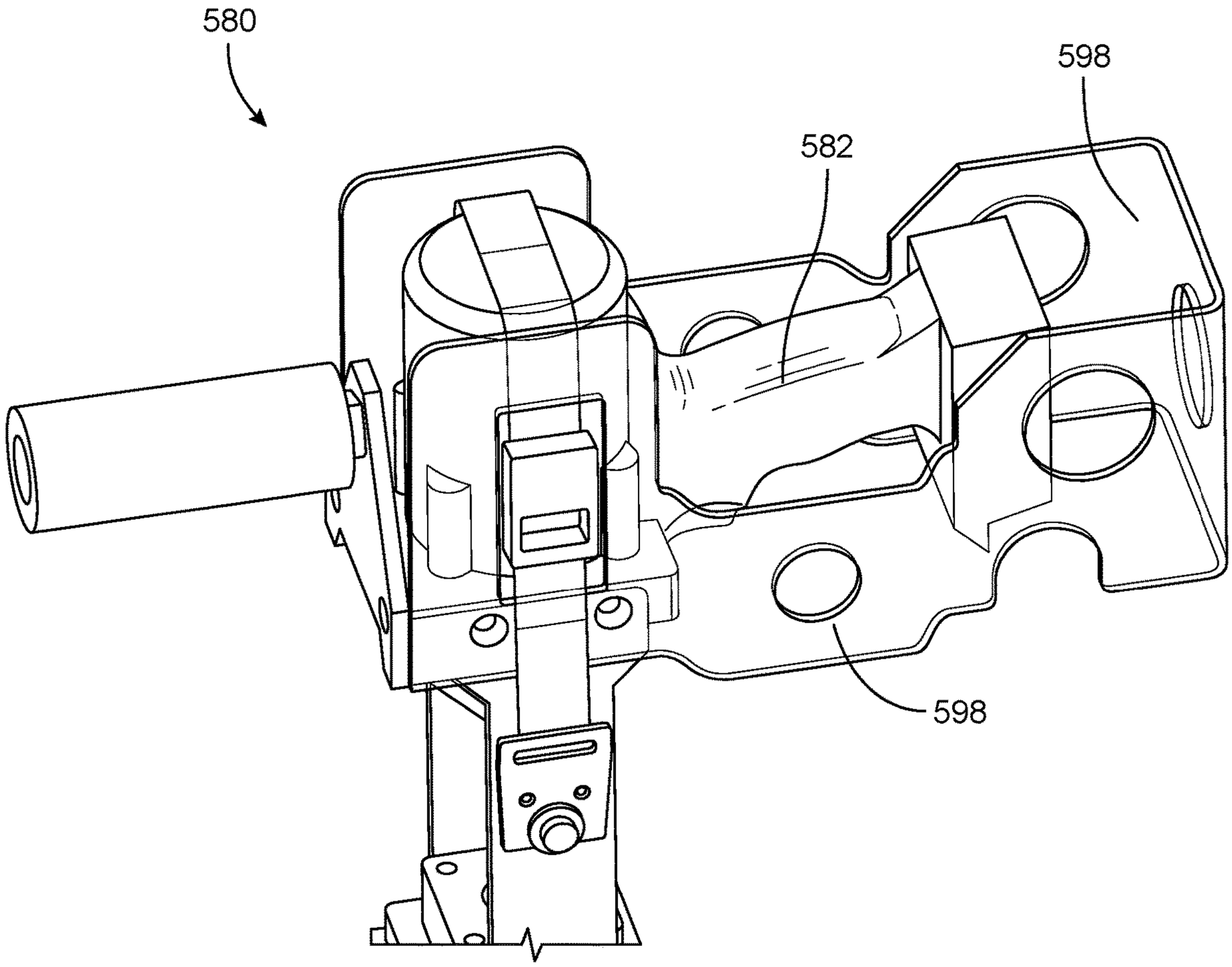

FIG. 21A

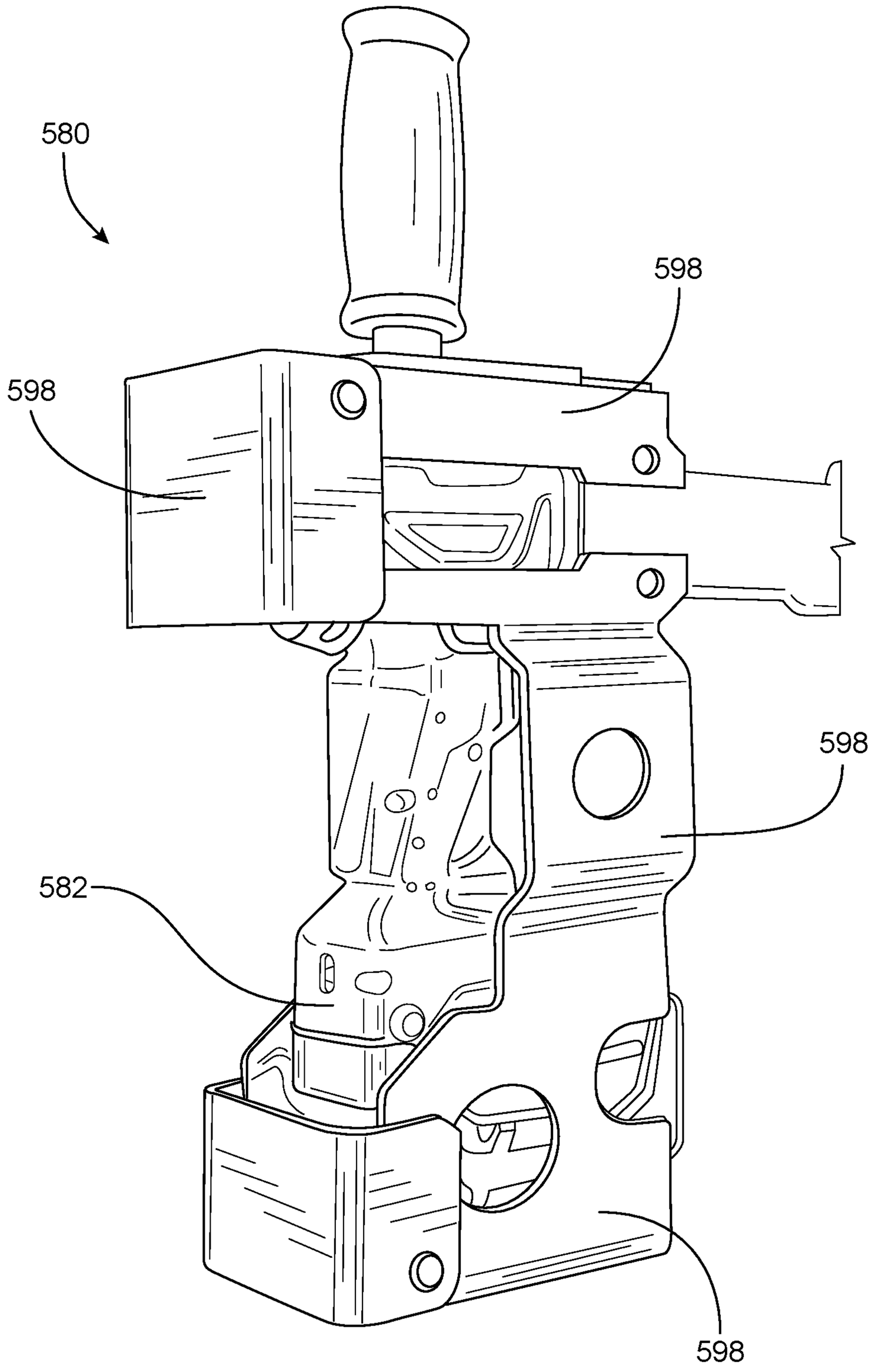

FIG. 21B

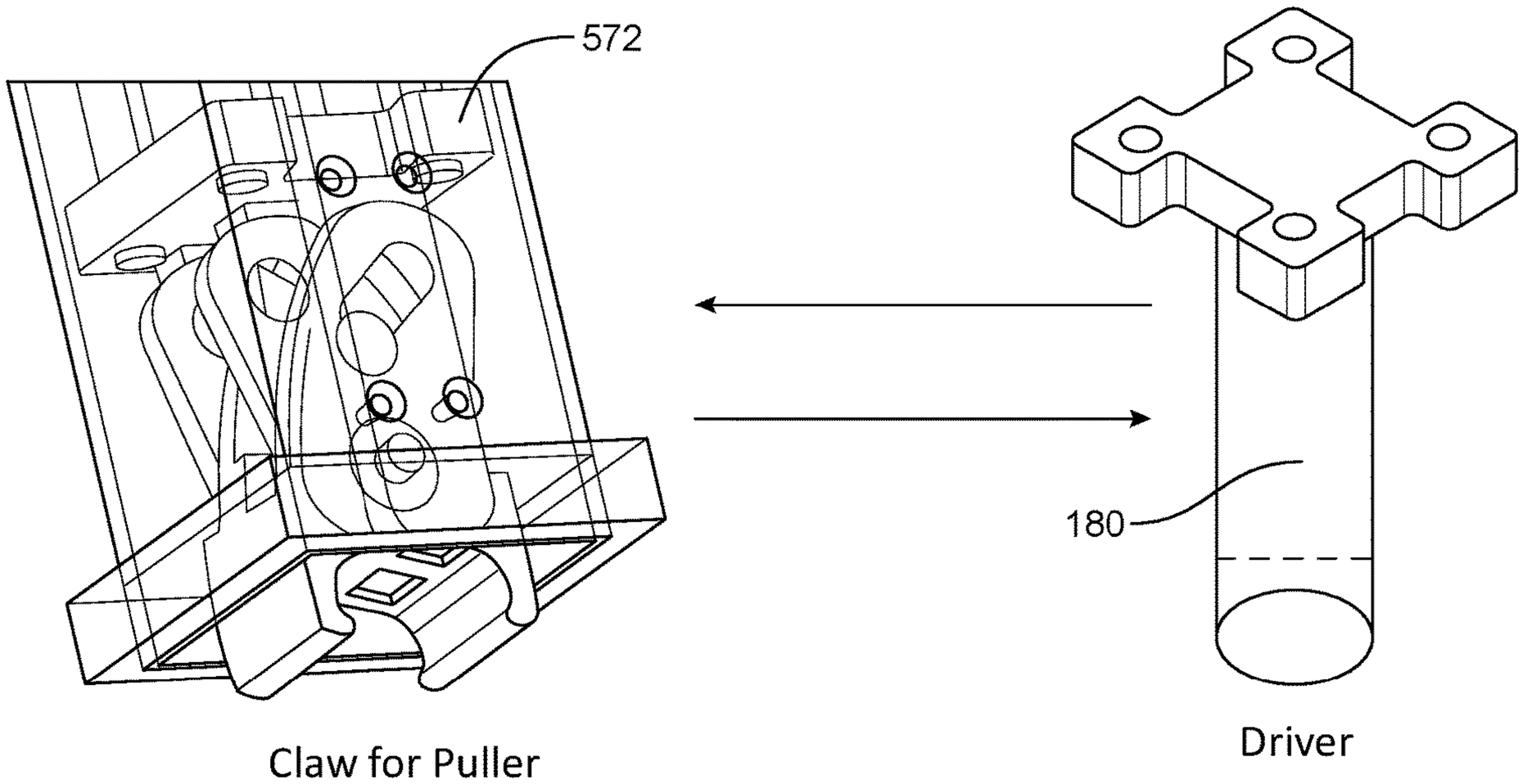

FIG. 22

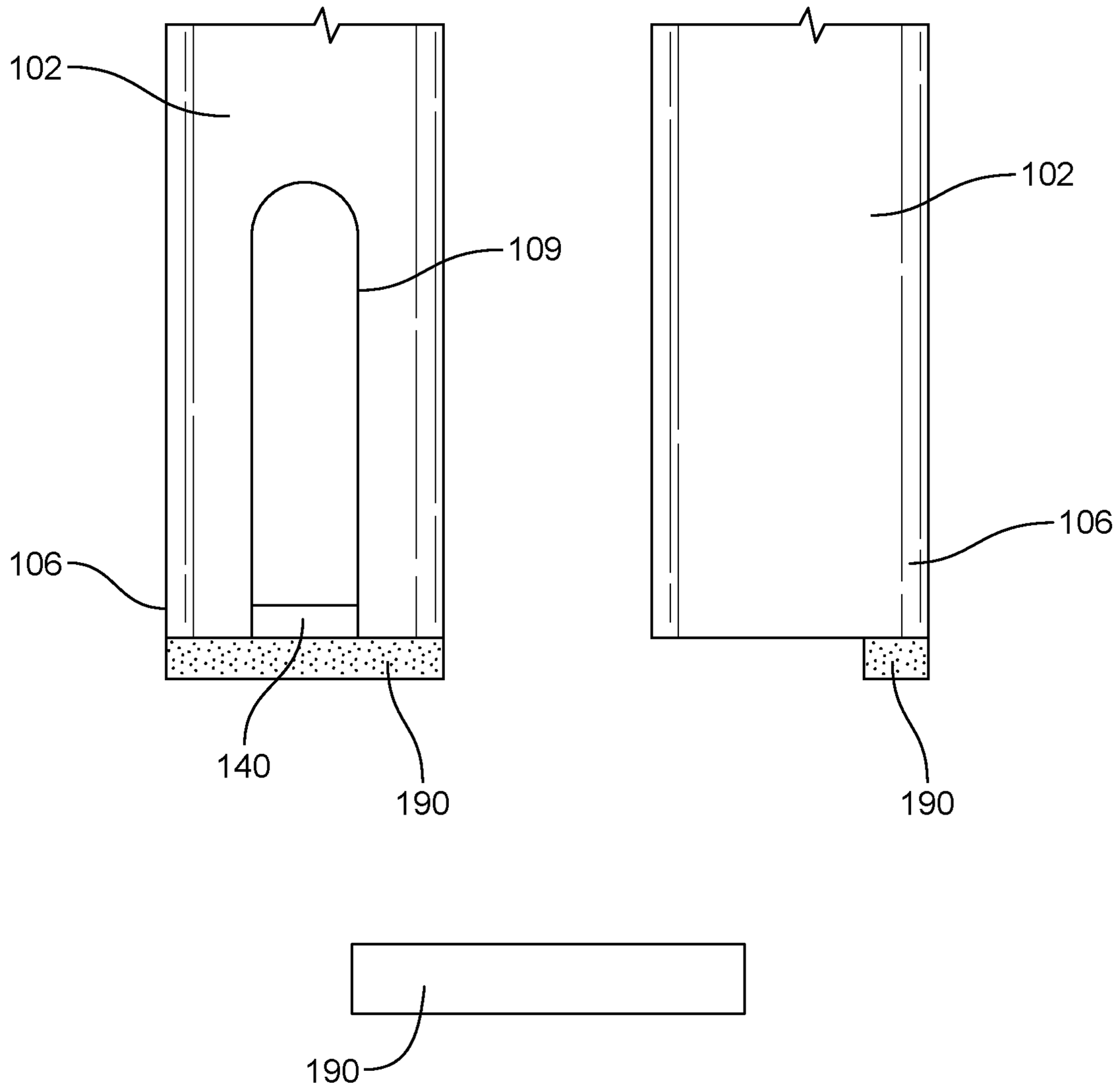

FIG. 23

RAILROAD SPIKE REMOVER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 16/734,125, entitled "Railroad Spike Remover," filed Jan. 3, 2020, which is a continuation-in-part application of U.S. patent application Ser. No. 15/175,900, entitled "Railroad Spike Remover," filed Jun. 7, 2016 (which issued as U.S. Pat. No. 10,597,828 on Mar. 24, 2020), and also claims priority to U.S. Provisional Application No. 62/788,925, filed Jan. 6, 2019, the content of all of which are hereby incorporated herein by reference in their entirety.

FIELD OF INVENTION

The field of invention for this disclosure relates to a portable railroad spike remover.

BACKGROUND

Removing railroad spikes from a rail tie has not changed much over time. Railroad spikes are often removed from a rail tie manually using a crowbar. A railroad spike may need as much as 5,000 pounds of vertical force to remove a spike embedded in a rail tie. A portable device to easily remove the railroad spikes would be a great improvement.

SUMMARY

The following presents a general summary of aspects of the invention in order to provide a basic understanding of the invention and various features of it. This summary is not intended to limit the scope of the invention in any way, but it simply provides a general overview and context for the more detailed description that follows.

The present disclosure provides an apparatus for removing railroad spikes from a rail tie that is portable and easy to use.

According to one aspect of the disclosure, an apparatus for removing a railroad spike from a rail tie comprises: a main housing that includes an upper housing and a lower housing, wherein the upper housing includes a bearing housing that contains one or more bearings; a drive shaft connected to the main housing and a mounting flange, the drive shaft extending through the one or more bearings and an opening in the bearing housing; and a plurality of standoffs with a first end and a second end, with the first end of the plurality of standoffs connected to the mounting flange and the second end of the plurality of standoffs connected to a clevis pivot plate with a clevis fastener that is connected to a claw assembly extractor. The claw assembly extractor may include a pair of jaw members that are pivotally connected to each other by a pivoting pin and a rotating pin. Each jaw member may include a lower end and a pair of upper members interlocked with each other. The lower end may be configured to contact and secure a railroad spike and the pair of upper members may be pivotally connected to the clevis fastener with the rotating pin. When the drive shaft is rotated, the claw assembly extractor and the mounting flange may move inside the main housing in a vertical direction to extract the railroad spike from the rail tie.

According to another aspect of the disclosure, an apparatus for removing a railroad spike from a rail tie comprises: a main housing that includes an upper housing and a lower housing, wherein the upper housing includes a bearing housing that contains one or more bearings; a drive shaft connected to the main housing and a mounting flange, the drive shaft extending through the one or more bearings and an opening in the bearing housing; a T-handle assembly to hold a battery-operated drill-type tool that connects to the drive shaft, wherein the T-handle assembly includes one or more fastening straps and one or more side plates to connect the T-handle assembly to the main housing; and a plurality of standoffs with a first end and a second end, with the first end of the plurality of standoffs connected to the mounting flange and the second end of the plurality of standoffs connected to a clevis pivot plate with a clevis fastener that is connected to a claw assembly extractor. The claw assembly extractor may include a pair of jaw members that are pivotally connected to each other by a pivoting pin and a rotating pin. Each jaw member may include a lower end and a pair of upper members interlocked with each other. The lower ends may be configured to contact and secure a railroad spike and the pair of upper members may be pivotally connected to the clevis fastener with the rotating pin. The claw assembly extractor may include a friction assembly that includes a spring and one or more friction caps to keep the jaws in an open position as the jaws are moved from an up position to a home position after a railroad spike has been pulled. When the drive shaft is rotated, the claw assembly extractor and the mounting flange moves inside the main housing in a vertical direction to extract the railroad spike from the rail tie.

According to another aspect of the disclosure, the rail spike remover may include a rail spike driver for driving the railroad spike into the rail tie. The rail spike driver may be interchangeable with the claw assembly extractor by removing the clevis pivot plate and attaching the rail spike driver to the plurality of standoffs.

According to yet another aspect of the disclosure the rail spike remover may include a rectangular leveling block located on a side of a bottom footer of the lower housing of the main housing, wherein the leveling block is utilized to level the main housing and the rail spike remover when removing railroad spike.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limited in the accompanying figures in which like reference numerals indicate similar elements and in which:

FIG. **1** illustrates a top front perspective view of an example embodiment of a rail spike remover according to one or more aspects described herein;

FIG. **2** illustrates a front view of the example embodiment of the rail spike remover of FIG. **1**,

FIG. **3** illustrates a top view of the example embodiment of the rail spike remover of FIG. **1**;

FIG. **4** illustrates a cross-sectional view of the example embodiment of the rail spike remover of FIG. **1**;

FIG. **5** illustrates a perspective view of an extractor from the example embodiment of the rail spike remover of FIG. **1** with other components removed;

FIG. **6** illustrates a top view of the extractor of FIG. **5**;

FIG. **7** illustrates a top view of an alternate embodiment of the extractor of the rail spike remover of FIG. **1**;

FIG. **8** illustrates a front view of an extractor tooth from the extractor of FIG. **7**;

FIG. **9** illustrates a cross-sectional view of the extractor tooth of FIG. **7**;

FIG. **10** illustrates a side perspective view of an alternate embodiment of the extractor of the rail spike remover of FIG. **1**;

FIG. **11** illustrates an internal side perspective view of the extractor and rail spike remover of FIG. **10**;

FIG. **12** illustrates a close-up view of a bottom portion of the extractor and rail spike remover of FIG. **10**;

FIG. **13** illustrates a close-up view of the extractor and rail spike remover of FIG. **10**;

FIG. **14** illustrates a side perspective view of the extractor of the rail spike remover of FIG. **10**;

FIGS. **15**A-**15**D illustrate the interchangeability of the extractors **140** and **340** for the railroad spike remover **100**;

FIGS. **16**A and **16**B illustrate perspective views of an alternate embodiment of the rail spike remover of FIGS. **1** and **10**;

FIG. **17**A illustrates a cross-sectional view along A-A of the rail spike remover of FIGS. **16**A and **16**B;

FIG. **17**B illustrates a cross-sectional view of detail B of the rail spike remover of FIGS. **16**A and **16**B;

FIG. **17**C illustrates a cross-sectional view of detail C of the rail spike remover of FIGS. **16**A and **16**B;

FIG. **17**D illustrates a cross-sectional view of detail D of the rail spike remover of FIGS. **16**A and **16**B;

FIGS. **18**A-**18**C illustrate perspective views of an upper housing of the rail spike remover of FIGS. **16**A and **16**B;

FIGS. **19**A and **19**B illustrate perspective views of a lower housing assembly of the rail spike remover of FIGS. **16**A and **16**B;

FIGS. **20**A-**20**C illustrate perspective views of a T-handle assembly of the rail spike remover of FIGS. **16**A and **16**B;

FIGS. **21**A and **21**B illustrate perspective views of a drill guard assembly for the T-handle assembly of FIGS. **20**A-**20**C;

FIG. **22** illustrates a schematic view illustrating the interchangeability of a rail spike driver with the extractor or claw assembly extractor of the rail spike remover of FIGS. **1**, **10**, **16**A, and **16**B; and

FIG. **23** illustrates a schematic view of a leveling block for use with the rail spike remover of FIGS. **1**, **10**, **16**A, and **16**B.

Further, it is to be understood that the drawings may represent the scale of different components of one single embodiment; however, the disclosed embodiments are not limited to that particular scale.

DETAILED DESCRIPTION

In the following description of various example structures according to the invention, reference is made to the accompanying drawings, which form a part hereof, and in which are shown by way of illustration various example devices, systems, and environments in which aspects of the invention may be practiced. It is to be understood that other specific arrangements of parts, example devices, systems, and environments may be utilized and structural and functional modifications may be made without departing from the scope of the present invention. Also, while the terms "top," "bottom," "front," "back," "side," "rear," and the like may be used in this specification to describe various example features and elements of the invention, these terms are used herein as a matter of convenience, e.g., based on the example orientations shown in the figures or the orientation during typical use. Nothing in this specification should be construed as requiring a specific three-dimensional orientation of

structures in order to fall within the scope of this invention. Also, the reader is advised that the attached drawings are not necessarily drawn to scale.

The following terms are used in this specification, and unless otherwise noted or clear from the context, these terms have the meanings provided below.

"Plurality," as used herein, indicates any number greater than one, either disjunctively or conjunctively, as necessary, up to an infinite number.

"Connected," as used herein, indicates that components may be connected directly being physically contacting each other or connected indirectly where the components are connected indirectly where the components do not physically contact, but have one or more intermediate components positioned between them.

"Integral joining technique" or means a technique for joining two pieces so that the two pieces effectively become a single, integral piece, including, but not limited to, irreversible joining techniques, such as adhesively joining, cementing, welding, brazing, soldering, or the like, where separation of the joined pieces cannot be accomplished without structural damage thereto. Pieces joined with such a technique are described as "integrally joined."

In the following description of the various embodiments, reference is made to the accompanying drawings, which form a part hereof, and in which is shown, by way of illustration, various embodiments in which aspects of the disclosure may be practiced. It is to be understood that other embodiments may be utilized and structural and functional modifications may be made without departing from the scope and spirit of the present disclosure.

In general, as described above, aspects of this invention relate to an apparatus to remove railroad spikes from a rail tie comprising a main column, a drive shaft and an extractor. More detailed descriptions of aspects of this invention follow.

One aspect of this invention relates to a portable railroad spike remover **100**, as shown in FIGS. **1**-**4**. Specifically, FIG. **1** illustrates a top front perspective view of an example embodiment of a railroad spike remover **100**. FIG. **2** illustrates a front view of the railroad spike remover **100**. FIG. **3** illustrates a top view of the railroad spike remover **100**. FIG. **4** illustrates a cross-sectional view of the railroad spike remover **100**. The railroad spike remover **100** may comprise a main column **102**, a bearing housing **110**, a plurality of standoffs **170**, a mounting flange **134**, an extractor **140**, and a drive shaft **120**. The main column **102** may have a first end **104**, a second end **106** opposite the first end **104**, and a center section **108** positioned between the two ends. The bearing housing **110** may be connected to the first end **104** of the main column **102** and have an opening **112** for inserting the drive shaft **120**. The drive shaft **120** may also extend through a bearing **114** secured in the bearing housing **110** by a cap plate **116**.

As illustrated in FIG. **4**, the drive shaft **120** may have a first end **122** and a second end **124** opposite the first end **122**. Near the first end **122**, the drive shaft **120** may extend through an opening in the bearing **114**, through an opening **112** in the bearing housing **110**, and through an opening in the cap plate **116**. Near the second end **124**, the drive shaft **120** may connect to the mounting flange **134**. The drive shaft **120** may be secured to the mounting flange **134** using a nut **137**.

The plurality of standoffs **170** may connect to the mounting flange **134** at one end and to the extractor **140** at the opposite end. Alternatively, the drive shaft **120** may connect directly to the extractor **140** without the need for the

mounting flange **134** and the plurality of standoffs **170**. The extractor **140** may engage and grip the railroad spike **10** to secure it. Once the extractor **140** secures the railroad spike **10**, a user may engage the first end **122** of the drive shaft **120** with a tool to provide torque to the drive shaft **120**. As the drive shaft **120** is rotated, the mounting flange **134** and the extractor **140** may move inside the column in a vertical direction to extract the railroad spike **10** from a rail tie. As the extractor **140** moves up within the main column **102**, the railroad spike **10** is removed from the rail tie.

The main column **102** may have a plurality of substantially vertical side walls that are open at both ends **104**, **106**. The main column may have a height of approximately 32 inches or within a range of 24 to 40 inches or any height. As shown in the exemplary embodiment shown in FIGS. **1-9**, the main column **102** may generally have a square cross-sectional shape. However, the main column may have any geometric cross-sectional shape, such as circular, triangular, such that the main column **102** may have any number of side walls. For example as shown in FIGS. **1** and **3**, the main column **102** may have four side walls, but may have 3 side walls, 5 side walls, 6 side walls or any number of side walls. The side walls may have a thickness of approximately 0.188 inches or within a range of 0.125 inches to 0.25 inches, or within a range of 0.06 inches to 0.375 inches. Each side wall may have a width of approximately 4 inches or within a range of 3 inches to 5 inches, or within a range of 2 inches to 6 inches.

As shown in FIG. **2**, at least one side wall of the main column **102** may have an aperture **109** that extends from the second end **106** to a portion of the height of the main column **102**. For example, the aperture **109** may have a height of approximately 20 percent of the height of the main column **102** or the aperture **109** may have a height that is within a range of 12 percent to 37 percent of the height of the main column. The aperture **109** may have an elongated shape and may have a height of approximately 7 inches or may be within a range of 5 inches to 9 inches. In addition, the aperture **109** may have a width of approximately 1.5 inches or within a range of 1.0 inch to 2.5 inches. The aperture **109** may align with the opening **147** of the extractor **140** to allow the railroad spike remover **100** to slide into position to engage the railroad spike **10** with the extractor **140**.

The bearing housing **110** may be integrally joined to the first end **104** of the main column **102**. Alternatively, the bearing housing **110** and main column **102** may be formed as a single piece. As previously discussed, the bearing housing **110** may have an opening **112**. The opening **112** may be located in the geometric center of the bearing housing **110** and may have a cylindrical shape to allow the drive shaft **120** to extend through the bearing housing **110**. The opening **112** may be through both ends of the bearing housing **110**. In addition, the bearing housing **110** may have a cavity **113** that is concentric with the opening **112**. The cavity **113** may be sized to contain the bearing **114** and have a cylindrical shape that is open at one end with a surface at the opposite end to engage one end of the bearing **114**. The bearing housing **110** may also have a plurality of holes around the perimeter of the housing. The plurality of holes may be threaded to releasably connect the cap plate **116**. The bearing **114** may be a roller bearing or bushing that enables the drive shaft **120** to rotate freely when the bearing **114** is installed onto the drive shaft **120** and into the bearing housing **110**.

The drive shaft **120** may have a first end **122** and a second end **124** and may be partially threaded. As shown in FIG. **4**, the drive shaft **120** may have a plurality of distinct diameter regions. For example, the drive shaft **120** may have a first region **128** with a first diameter **129** corresponding to the threaded region, a second region **130** having a second diameter **131** with a smooth surface, and a third region **132** which may have a third diameter **133**. The first diameter **129** may be greater than both the second diameter **131** and the third diameter **133**. The first diameter **129** may be approximately 1 inch or within a range of 0.75 inches and 1.5 inches or within a range of 0.5 inches to 2.0 inches. The threaded portion (first region **128**) may be ACME threads or other similar threads. Alternatively, the drive shaft **120** may have two distinct diameter regions or four distinct diameter regions.

The first end **122** may have a drive element **127** to allow a user to engage the drive shaft **120** with a rotating tool, such as a torque wrench **20** or similar device to rotate the drive shaft **120**. As shown in FIG. **3**, the drive element **127** may have a hexagonal shape to be engaged by a standard hexagonal socket. The standard hexagonal socket may be a 0.5 inches or larger. Preferably, the torque wrench **20** has a length of 18 inches or longer. A battery-operated drill-type apparatus or an air hammer attached to a pneumatic supply could be utilized as the rotating tool in lieu of the torque wrench **20**, thereby engaging the drive shaft **120** and rotating the drive shaft **120** to move the drive shaft **120** up and down.

As discussed the drive shaft **120** may connect to the mounting flange **134**. The mounting flange **134** may have a centrally located aperture **136** to connect the drive shaft **120**. The mounting flange **134** may be connected to the drive shaft in a plurality of ways. For example, the aperture **136** may be threaded to directly engage the drive shaft **120**, or alternatively as shown in FIG. **4**, a nut **137** may be connected to the aperture **136** of the mounting flange **134** where the drive shaft **120** may connect to the mounting flange **134** with the nut **137** positioned between the mounting flange **134** and the drive shaft **120**. The nut **137** may be integrally joined to the mounting flange **134** or some may be connected using an anti-rotation element to prevent the nut **137** from rotating in relation to the mounting flange **134** when the drive shaft **120** is rotated, such as a set screw. The mounting flange **134** may also have a plurality of mounting holes positioned around the perimeter to allow for easy connection to the plurality of standoffs **170**. The mounting flange **134** may be releasably connected to the standoffs **170** or the drive shaft **120** to allow any repairs that may be required.

The plurality of standoffs **170** may be hollow tubes that connect at a first end to a mounting flange **134** and a second end of connected to an extractor **140**. Each standoff **170** may have internal threads such that they may be releasably connected using a threaded fastener. Alternatively, the plurality of standoffs **170** may be integrally joined to the either the mounting flange **134** or extractor **140** or both.

Each standoff **170** may be approximately 7 inches long or within a range of 5 inches to 9 inches or within a range of 3 inches to 12 inches. Each of the standoffs **170** may be the same length, but depending on the shape of the either the mounting flange **134** or extractor **140**, each of the standoffs **170** may have different lengths.

As discussed above, the plurality of standoffs **170** connect to an extractor **140**. As shown in FIGS. **5** and **6**, the extractor **140** may comprise a metallic plate with a top surface **141**, a bottom surface **142**, and a plurality of side surfaces **143**, **144**, **145**, **146**. The extractor **140** may further comprise an opening **147** through the top and bottom surface and extending through at least one side surface. The opening may further include an upper portion **148** and a lower portion **149**. The lower portion **149** of the opening may have a plurality of

tapered side walls **150**, **151** and a first rounded rear wall **152**. The plurality of tapered side walls **150**, **151** may be vertically oriented and taper toward one another. The upper portion **148** of the opening may have vertically oriented side walls **153**, **154**, and a second rounded rear wall **155**, wherein the width of the upper portion **148** is larger than the width of the lower portion **149**. The first rounded rear wall **152** and the second rounded rear wall **155** may be concentric. The extractor **140** may have a plurality of holes **158** to releasably connect the extractor **140** to the plurality of standoffs **170**. The plurality of holes **158** may be positioned near the side surfaces **143**, **144**, **145**, **146** of the extractor **140** and extend through the top surface **141** and bottom surface **142**. The plurality of holes **158** may be threaded or clearance holes for a threaded fastener. Alternatively, as discussed above, the extractor **140** may be integrally joined to the standoffs **170**. Additionally, as discussed above, the extractor **140** may be connected directly to the drive shaft **120**.

FIGS. **7-9** show an alternate embodiment for the extractor **140**. For the embodiment of FIGS. **7-9**, the features of the extractor **240** are referred to using similar reference numerals under the "2XX" series of reference numerals, rather than "1XX" as used in the embodiment of FIGS. **5** and **6**. Accordingly, certain features of the extractor **240** that were already described above with respect to the extractor **140** of FIGS. **5-6** may be described in lesser detail, or may not be described at all.

The extractor **240** may have the similar exterior shape as extractor **140** to fit within the main column **102** with a top surface **241**, a bottom surface **242**, and a plurality of side surfaces **243**, **244**, **245**, **246**. An opening **247** may extend through at least two side surfaces and the bottom surface **242**. The opening **247** may include a first guide rail **248**, a second guide rail **249**, a first side wall **250** adjacent the first guide rail, a second side wall **251** adjacent the second guide rail, and an upper surface **252** connecting the first guide rail **248** to the second guide rail **249**. The upper surface **252** of the opening may be rounded and exposed to the exterior. The opening **247** may have a first end **253** and a second end **254**, wherein a first height **255** at the first end **253** may be defined as a distance perpendicular from the bottom surface **242** of the extractor **240** to the furthest extent of the upper surface **252** and the second end **254** may have a second height **256** defined from the bottom surface **242** to the furthest extent of the second end **254** of the upper surface **252**. The bottom surface **242** may further include an angled region **257**, such that the angled region **257** angles upward toward the first end **253** of the opening **247**.

Additionally, the top surfaces of the first guide rail **248** and the second guide rail **249** may be coplanar surfaces. The first guide rail **248** may have a height at the first end **253** of the opening **247** defined as a perpendicular distance from the bottom surface **242** of the extractor **240** to the furthest extent of the first end **253** of the first guide rail **248**. Similarly, the second end **254** may have a second height defined as a perpendicular distance from the bottom surface **242** to the furthest extent of the second end **254** of the first guide rail **248**, wherein the first height is smaller than the second height. The guide rails **248**, **249** may be linear surfaces and angle in a direction away from the bottom surface **242**. Thus, the opening **247** may be larger at the first end **253** than at the second end **254**.

The first side wall **250** adjacent the first guide rail **248** and the second side wall **251** adjacent the second guide rail **249** are parallel. Alternatively, the first side wall **250** adjacent the first guide rail **248** and the second side wall **251** adjacent the second guide rail **249** are angled toward one another. Also, similar to the extractor **140**, the extractor **240** may have a plurality of holes **258** to connect the extractor **240** to the plurality of standoffs **170**.

The various components for the railroad spike remover **100**, such as the main column **102**, the bearing housing **110**, the drive shaft **120**, the mounting flange **134**, the plurality of standoffs **170**, and the extractor **140**, **240** may be made of a metallic material, preferably a steel alloy. Alternatively, the components may be made of other metallic materials such as iron, aluminum, an aluminum alloy, titanium, or a titanium alloy.

The railroad spike remover **100** may be portable for a single user to move and operate. Thus, the railroad spike remover **100** may have a weight of less than 50 pounds. In other embodiments of this invention, the railroad spike remover **100** and **500** may have a weight of less than 30 pounds.

To operate the railroad spike remover **100**, a user may position the railroad spike remover **100** near a railroad spike **10** and then slide the opening **147** of the extractor **140** onto the top of the railroad spike **10** such that the railroad spike **10** is secured in extractor **140**. The user may then position the railroad spike remover **100** over the railroad spike **10**. The user then engages the drive element **127** with the torque wrench **20** and rotates the drive shaft **120** to raise the mounting flange **134** and the extractor **140**. As the drive shaft **120** is turned, the extractor **140**, along with the railroad spike **10**, raises into the main column **102** until the railroad spike **10** is released from the rail tie. Then, the user may reverse the drive shaft **120** to lower the mounting flange **134** and the extractor **140** to allow the railroad spike remover **100** to be ready to remove another railroad spike **10**. As was discussed above, a battery-operated drill-type apparatus or an air hammer attached to a pneumatic supply could be utilized in lieu of the torque wrench, thereby engaging the drive shaft **120** and rotating the drive shaft to move the drive shaft **120** up and down.

FIGS. **10-14** show an alternate embodiment for the extractor **140**, **240**. For the embodiment of FIGS. **10-14**, in the place of the extractor **140**, **240**, the railroad spike remover **100** may include an extractor **340** with moving jaws **342** that are frictionally delayed. The features of the extractor **340** are referred to using similar reference numerals under the "3XX" series of reference numerals, rather than "1XX" as used in the embodiment of FIGS. **5** and **6**. Accordingly, certain features of the extractor **340** that were already described above with respect to the extractor **140** of FIGS. **5-6** may be described in lesser detail, or may not be described at all. The extractor **340** may be used with similar features of the railroad spike remover **100** already described above. 7 FIG. **10** illustrates a side perspective view of an alternate embodiment of the extractor of the rail spike remover of FIG. **1**. FIG. **11** illustrates an internal side perspective view of the extractor and rail spike remover of FIG. **10**. FIG. **12** illustrates a close-up view of a bottom portion of the extractor and rail spike remover of FIG. **10**. FIG. **13** illustrates a close-up view of the extractor and rail spike remover of FIG. **10**. FIG. **14** illustrates a side perspective view of the extractor of the rail spike remover of FIG. **10**.

As discussed above, the plurality of standoffs **170** connect to an extractor **340**. As shown in FIGS. **10-14**, the extractor **340** may comprise a claw assembly extractor. Generally, the claw assembly extractor **340** may be designed to open, close, and grab with the drive shaft **120** movement the railroad spike at a force as high as 19,000 pounds. The claw assembly extractor **340** may include a pair of jaws **342** that

are pivotally connected to each other by a pivoting pin **344** and a rotating pin **346**. The lower ends **348** of the jaws **342** are configured to contact and grab the railroad spike **10**. The upper members **350** of the jaws **342** are pivotally connected to the mounting flange **134** with the rotating pin **346** or the pivoting pin **344** as illustrated in FIG. **15**A. When the drive shaft **120** is pulled upward, the jaws **342** move towards a grabbing position to grab onto the railroad spike **10**.

The extractor **340** and claw assembly extractor includes the two jaws **342**, a pivoting pin **344**, the two upper members **350**, spacer caps, a rotating pin **346**, and a friction assembly. The friction assembly generally includes a spring and friction caps. The jaws **342** and upper members **350** form a moveable parallelogram assembly. The jaws **342** each have a pivot hole **352** which the pivot pin **344** is located in. The jaws **342** also each have a rotating section **354** which the rotating pin **346** is located in. The upper members **350** of the jaws **342** are pivotally connected to the jaws **342** by their rotating sections **354** and the rotating pins **346**. The upper members **350** of the jaws **342** may be also pivotally connected to the mounting flange **134** and drive shaft **120** by the pivoting pin **346**.

The friction assembly functions for keeping the jaws **342** in an open position as the jaws **342** are moved from the up position to the home position after a spike **10** has been pulled. Initially, a user places the railroad spike remover **100** over the spike **10** with the jaws **342** in the open position. When the user begins movement of the railroad spike remover **100**, the drive shaft **120** is moved upward, pulling the upper members **350** upward and rotated pulling the upper members **350** of the jaws **342** towards each other. The friction assembly keeps the centers of the jaws **342** fixed relative to the main column **102** such that the jaws **342** only initially rotate and do not translate relative to the main column **102**. Thus, the lower ends **348** of the jaws **342** are able to rotate under the head of the spike **10**. Then the jaws **342** are stopped by the spike **10** from further rotation, the upward movement of the drive shaft **120** overcomes the frictional forces of the friction assembly and the jaws **342** translate upward along the interior of the main column **102** pulling the spike **10** with it. When the user releases the movement of the railroad spike remover **100**, the drive shaft **120** is moved downward back towards its home position. The friction assembly initially holds the center of the jaws **342** fixed relative to the main column **102** such that the jaws **342** only initially rotate and translate to move the jaws **342** to an open position. As the jaws **342** are opened, the spike **10** is able to be released. The jaws **342** stop rotating and start translating down the main column **102** when the back surfaces of the jaws **342** lower ends contact the opposite interior sides of the main column **102**. The lower ends **348** of the jaws **342** substantially block an area between the main column **102** and the back surfaces to prevent the spike **10** from entering this area. After the jaws **342** open the downward movement of the drive shaft moves the jaws **342** downward back to their home position while maintaining the jaws **342** in their open position along this home returning movement.

The claw assembly extractor and the jaws **342** includes a frictionally-delayed movement that includes pivoting claws **348** with arms or upper members **350** that frictionally contact each other and/or the main column **102** when opening and closing the jaws **342**. The frictionally-delayed moving jaws functions as a means for keeping the jaws in an open position as the jaws **342** are moved from the up position to the home positions after a spike **10** has been pulled.

Additionally, FIGS. **15**A-**15**D illustrate the interchangeability of the extractors **140** and **340** for the railroad spike remover **100**. FIG. **15**A illustrates fastening the mounting flange **134** to the top end of the main column **104** and the bearing housing **110** with the bolts and the standoffs **170**. FIG. **15**B illustrates sliding the standoffs **170** (or long bolts) into the extractor **140** (or claw) and then sliding the sleeves onto the standoffs **170** (or long bolts). FIG. **15**C illustrates the use of spacers installed onto the extractor **140** (or claw) as needed, which will adjust the stroke of the railroad spike remover **100** from 4.5 to 6.5 inches. FIG. **15**D illustrates sliding the extractor assembly (or claw assembly) into the main column **102** and tightening the four standoffs **170** (or long bolts) into the mounting flange **134**.

FIGS. **16**A-**20**C show an alternate embodiment for a rail spike remover **500**. The features of the rail spike remover **500** are referred to using similar reference numerals under the "5XX" series of reference numerals, rather than "1XX" or "3XX" as used in the embodiments of FIGS. **1** and **10**. Accordingly, certain features of the rail spike remover **500** that were already described above with respect to the rail spike remover **100** of FIGS. **1-9** or the rail spike remover **300** of FIGS. **10-15**D may be described in lesser detail, or may not be described at all. The rail spike remover **500** may be used with similar features of the railroad spike remover **100**, **300** already described above. FIGS. **16**A and **16**B illustrate perspective views of an alternate embodiment of the rail spike remover of FIGS. **1** and **10**. FIG. **17**A illustrates a cross-sectional view along A-A of the rail spike remover of FIGS. **16**A and **16**B. FIG. **17**B illustrates a cross-sectional view of detail B of the rail spike remover of FIGS. **16**A and **16**B. FIG. **17**C illustrates a cross-sectional view of detail C of the rail spike remover of FIGS. **16**A and **16**B. FIG. **17**D illustrates a cross-sectional view of detail D of the rail spike remover of FIGS. **16**A and **16**B. FIGS. **18**A-**18**C illustrate perspective views of an upper housing of the rail spike remover of FIGS. **16**A and **16**B. FIGS. **19**A and **19**B illustrate perspective views of a lower housing assembly of the rail spike remover of FIGS. **16**A and **16**B. FIGS. **20**A-**20**C illustrate perspective views of a T-handle assembly of the rail spike remover of FIGS. **16**A and **16**B.

The railroad spike remover **500** may comprise a main housing **502**, a bearing housing **510**, a plurality of standoffs **570**, a mounting flange **534**, an extractor **540**, and a drive shaft **520** attached to a T-handle assembly **580** with a battery-operated drill-type tool **582**. The main housing **502** may have an upper housing **504** and a lower assembly housing **506**. The bearing housing **510** may be connected to the upper housing **504** and have an opening **512** for inserting the drive shaft **520**. The drive shaft **520** may also extend through one or more bearings **514** secured in the bearing housing **510** by a cap plate **516**.

As illustrated in FIG. **17**A, the drive shaft **520** may have a first end **522** and a second end **524** opposite the first end **522**. Near the first end **522**, the drive shaft **520** may extend through an opening in the bearing **514**, through an opening **512** in the bearing housing **510**, and through an opening in the cap plate **516**. As further illustrated in FIG. **17**C, near the second end **524**, the drive shaft **520** may connect to the mounting flange **534**. The drive shaft **520** may be secured to the mounting flange **534** using a nut **537**.

As illustrated in FIGS. **17**C and **17**D, the plurality of standoffs **570** may connect to the mounting flange **534** at one end and to a clevis pivot plate **572** on the other end. The clevis pivot plate **572** may be attached to a clevis fastener **574** which may then be connected to the extractor **540** or the claw assembly extractor **540**.

As further illustrated in FIG. **17**D, the extractor **540** comprises a claw assembly extractor **540**. Generally, the claw assembly extractor **540** may be designed to open, close, and grab with the drive shaft **520** movement the railroad spike at a force as high as 19,000 pounds. As described above and illustrated for the extractor **340** and FIGS. **10-14**, the claw assembly extractor **540** may include a pair of jaws **542** that are pivotally connected to each other by a pivoting pin **544** and a rotating pin **546**. The lower ends **548** of the jaws **542** are configured to contact and grab the railroad spike **10**. The upper members **550** of the jaws **542** are pivotally connected to the clevis fastener **574** with the rotating pin **546** or the pivoting pin **544** as illustrated in FIG. **17**D. When the drive shaft **520** is pulled upward, the jaws **542** move towards a grabbing position to grab onto the railroad spike **10**.

The claw assembly extractor **540** includes the two jaws **542**, a pivoting pin **544**, the two upper members **550**, spacer caps, a rotating pin **546**, and a friction assembly. The friction assembly generally includes a spring and friction caps. The jaws **542** and upper members **550** form a moveable parallelogram assembly. The jaws **542** each have a pivot hole **552** which the pivot pin **544** is located in. The jaws **542** also each have a rotating section **554** which the rotating pin **546** is located in. The upper members **550** of the jaws **542** are pivotally connected to the jaws **542** by their rotating sections **554** and the rotating pins **546**. The upper members **550** of the jaws **542** may be also pivotally connected to the clevis fastener **574** and the clevis pivot plate **572** by the pivoting pin **546**.

The friction assembly functions for keeping the jaws **542** in an open position as the jaws **342** are moved from the up position to the home position after a spike **10** has been pulled. Initially, a user places the railroad spike remover **100** over the spike **10** with the jaws **542** in an open position. When the user begins rotation of the drive shaft **520** of the railroad spike remover **500**, the drive shaft **520** is moved upward, pulling the upper members **550** upward and rotated pulling the upper members **550** of the jaws **542** towards each other. The friction assembly keeps the centers of the jaws **542** fixed relative to the main housing **502** such that the jaws **542** only initially rotate and do not translate relative to the main housing **502**. Thus, the lower ends **548** of the jaws **542** are able to rotate under the head of the spike **10**. Then the jaws **542** are stopped by the spike **10** from further rotation and the upward movement of the drive shaft **520** overcomes the frictional forces of the friction assembly and the jaws **542** translate upward along the interior of the main housing **502** pulling the spike **10** with it. When the user releases the movement of the railroad spike remover **100** and rotates the drive shaft **520** downward, the drive shaft **520** is moved downward back towards its home position. The friction assembly initially holds the center of the jaws **542** fixed relative to the main housing **502** such that the jaws **542** only initially rotate and translate to move the jaws **542** to an open position. As the jaws **542** are opened, the spike **10** is able to be released. The jaws **542** stop rotating and start translating down the main housing **502** when the back surfaces of the jaws **542** lower ends contact the opposite interior sides of the main housing **502**. The lower ends **548** of the jaws **542** substantially block an area between the main housing **502** and the back surfaces to prevent the spike **10** from entering this area. After the jaws **542** open the downward movement of the drive shaft **520** moves the jaws **542** downward back to their home position while maintaining the jaws **542** in their open position along this home returning movement.

The claw assembly extractor **540** and the jaws **542** includes a frictionally-delayed movement that includes pivoting claws **548** with arms or upper members **550** that frictionally contact each other and/or the main housing **502** when opening and closing the jaws **542**. The frictionally-delayed moving jaws **542** function as a means for keeping the jaws **542** in an open position as the jaws **542** are moved from the up position to the home positions after a spike **10** has been pulled.

The main housing **502** may include both an upper housing **504** and a lower assembly housing **506**. As illustrated in FIGS. **18**A, **18**B, **18**C, **19**A, and **19**B, the upper housing **504** and the lower assembly housing **506** may include a plurality of substantially vertical side walls. The main housing **502** may have a height of approximately 24 inches or within a range of 16 to 40 inches or any height. The upper housing **504** may have a height of approximately 10 inches or within a range of 6 to 18 inches or any height. The lower assembly housing **506** may have a height of approximately 14 inches or with a range of 10 to 22 inches or any height. As shown in the exemplary embodiment shown in FIGS. **16**A-**20**C, the main housing **502**, the upper housing **504**, and the lower assembly housing **506** may generally have a square cross-sectional shape. For example as shown in FIGS. **16**A-**20**C, the main housing **502**, the upper housing **504**, and the lower assembly housing **506** may have four side walls. Each side wall may have a width of approximately 3.5 inches or within a range of 3 inches to 4 inches, or within a range of 2 inches to 6 inches. Additionally, the upper housing **504** may include a housing handle **508** attached to the upper housing **504**. The lower housing assembly **506** may also include a housing handle without departing from the invention.

As shown in FIGS. **16**A, **16**B, **20**A, **20**B, and **20**C, a T-handle assembly **580** with a battery-operated drill-type tool **582** may be connected to the drive shaft **520** to rotate the drive shaft **520**. The first end **522** of the drive shaft **520** may have a drive element **527** to allow a user to engage the drive shaft **520** with the T-handle assembly **580** and the battery-operated drill-type tool **582**, such as a high-impact torque wrench or similar device to rotate the drive shaft **520**. The battery-operated drill-type tool **582** may include a rechargeable battery pack **583**. The drive element **527** may have a hexagonal shape to be engaged by a standard hexagonal high impact socket **592** on the T-handle assembly **580**. The standard hexagonal socket may be 0.5 inches or larger. A battery-operated drill-type apparatus or an air hammer attached to a pneumatic supply could be utilized as the rotating tool, thereby engaging the drive shaft **520** and rotating the drive shaft **520** to move the drive shaft **520** up and down. The T-handle assembly **580** may also allow the battery-operated drill-type tool **582** to be easily removed by a user and removed for storage.

As illustrated in FIGS. **20**A, **20**B, and **20**C, the T-handle assembly **580** may include a drill face plate **596** to hold the battery-operated drill-type tool **582**. The drill face plate **596** may be connected to a handle plate **594** extending perpendicular to the drill face plate **596**. A handle **586** may be extend perpendicular and be connected to the handle plate **594**. A handle grip **588** may surround the handle **586** and may be made of a foam material. One or more fastening straps **590** and one or more side plates **584** may be utilized to connect the T-handle assembly **580** to the main housing **502** and specifically to the upper housing **504**. The one or more fastening strips **590** may be designed to be quick-connect straps to quickly disconnect the battery-operated drill-type tool **582** from the main housing **502** and upper housing **504** of the railroad spike remover **500**. The one or

more side plates may extend from and connect to the drill face plate **596**. The one or more straps **590** may surround and secure the battery-operated drill-type tool **582** to the drill face plate **596**, thereby securing the T-handle assembly **580** to the main housing **502**. Additionally, the battery-operated drill-type tool **582** may be attached to an impact socket **592** which then connects to the drive element **527** of the drive shaft **520**. The battery-operated drill-type tool **582** may be other similar tools, such as electronic, pneumatic, or other such drill-type tools that will perform similar functionality as a battery-operated drill-type tool **582**.

In another embodiment of the present invention, as illustrated in FIGS. **21**A and **21**B, the T-handle assembly **580** may include a drill guard structure **598**. The drill guard structure **598** may be connected to the T-handle assembly **580** and provide a guard for the battery-operated drill-type tool **582**. The drill guard structure **598** may include a case over the battery-operated drill-type tool **582** while allowing the user to hole the battery-operated drill-type tool **582**. The drill guard structure **598** may include side panels that extend the length of the battery-operated drill-type tool **582** and a back panel that covers the battery area. The drill guard structure **598** may also include front panels that cover the rotating section of the battery-operated drill-type tool **582**.

The plurality of standoffs **570** may be hollow tubes that connect at a first end to a mounting flange **534** and a second end of connected to a clevis pivot plate **572**. The clevis pivot plate **572** may be attached to a clevis fastener **574** which is then connected to the claw assembly extractor **540**. Each standoff **570** may have internal threads such that they may be releasably connected using a threaded fastener on the clevis pivot plate **572**. Alternatively, the plurality of standoffs **570** may be integrally joined to the either the mounting flange **534** or the clevis pivot plate **572** or both. Each standoff **570** may be approximately 7 inches long or within a range of 5 inches to 9 inches or within a range of 3 inches to 12 inches. Each of the standoffs **570** may be the same length, but depending on the shape of the either the mounting flange **534**, the clevis pivot plate **572**, or the extractor **540**, each of the standoffs **570** may have different lengths.

The various components for the railroad spike remover **500**, such as the main housing **502**, the bearing housing **510**, the drive shaft **520**, the mounting flange **534**, the plurality of standoffs **570**, the T-handle assembly **580**, and the claw assembly extractor **540** may be made of a metallic material, preferably a steel alloy. Alternatively, the components may be made of other metallic materials such as iron, aluminum, an aluminum alloy, titanium, or a titanium alloy.

In another embodiment of the present invention, as illustrated in FIG. **22**, the rail spike remover **100**, **500** may include a quick attachment that allows the rail spike remover to be either a spike puller or a spike driver. The rail spike remover **100**, **500** may also include rail spike driver **180** that can be interchangeable with any of the extractor **140**, extractor **340**, or the claw assembly extractor **540**. For example, the rail spike driver **180** may be quickly interchanged with the claw assembly extractor **540** by removing the clevis pivot plate **572** and attaching the rail spike driver **180** to the plurality of standoffs **570**. Additionally, and similarly, the rail spike driver **180** may be interchanged with extractor **140** and the extractor **340**. The rail spike driver **180** may be utilized.

In another embodiment of the present invention, as illustrated in FIG. **23**, the rail spike remover **100**, **500** may include a leveling block **190** for use with the rail spike remover of FIGS. **1**, **10**, **16**A, and **16**B. The leveling block **190** may be located on one side of the bottom footer of the second end **106** of the main column **102** or the lower assembly housing **506** of the main housing **502** of the rail spike remover **100**, **500**. As illustrated in FIG. **23**, the leveling block **190** may be rectangular in shape. The leveling block **190** may be utilized to help level the rail spike remover **100**, **500** when removing railroad spikes. Additionally, the leveling block **190** may be utilized to help remove the rails flanged angle when pulling railroad spikes.

CONCLUSION

While the invention has been described in detail in terms of specific examples including presently preferred modes of carrying out the invention, those skilled in the art will appreciate that there are numerous variations and permutations of the above described systems and methods.

We claim:

1. A portable apparatus for removing a railroad spike from a rail tie, the apparatus comprising: a main housing that includes an upper housing and a lower housing, wherein the upper housing includes a bearing housing that contains one or more bearings; a drive shaft connected to the main housing and a mounting flange, the drive shaft extending through the one or more bearings and an opening in the bearing housing; a T-handle assembly connected to the main housing and configured to hold a battery-operated drill-type tool that connects to and rotates the drive shaft, wherein the T-handle assembly includes one or more fastening straps configured to secure the battery-operated drill-type tool to the apparatus; and a claw assembly extractor connected to the drive shaft via the mounting flange, wherein the claw assembly extractor includes a pair of jaw members that are pivotally connected to each other by a pivoting pin and a rotating pin, and further wherein each of the jaw members includes a lower end configured to contact and secure a railroad spike and a pair of upper members interlocked with each other, wherein when the drive shaft is rotated, the claw assembly extractor and the mounting flange moves inside the main housing in a vertical direction to extract the railroad spike from the rail tie.

2. The apparatus of claim **1**, wherein the drive shaft has a first end and a second end, wherein the first end includes a drive and the second end includes a threaded portion.

3. The apparatus of claim **1**, wherein the bearing housing is integrally joined to the main housing.

4. The apparatus of claim **1**, wherein when the drive shaft is pulled upward, the pair of jaws move towards a grabbing position to grab onto the railroad spike.

5. The apparatus of claim **1**, wherein each of the interlocked upper members include a rotating section in which the rotating pin is located.

6. The apparatus of claim **1**, wherein the claw assembly extractor includes a friction assembly that includes a spring and one or more friction caps to keep the jaws in an open position as the jaws are moved from an up position to a home position after a railroad spike has been pulled.

7. The apparatus of claim **1**, wherein the battery-operated drill-type tool includes an impact socket that connects to a drive of the drive shaft.

8. The apparatus of claim **1**, wherein the T-handle assembly includes one or more side plates to connect the T-handle assembly to the main housing.

9. The apparatus of claim **1**, wherein the T-handle assembly includes a handle plate with a handle and a handle grip that surrounds the handle.

10. The apparatus of claim **1**, wherein the one or more fastening straps comprise quick-connect straps configured to allow a user to disconnect the battery-operated drill-type tool from the apparatus.

11. The apparatus of claim **1**, wherein the portable apparatus weighs less than 30 pounds.

12. The apparatus of claim **1**, wherein the mounting flange is connected to the claw assembly extractor via one or more standoffs.

13. The apparatus of claim **12**, wherein the each of the one or more standoffs comprises a hollow tube with a length of between 3 and 12 inches.

14. The apparatus of claim **12**, wherein the pair of upper members are pivotally connected to a clevis fastener of a clevis pivot plate with the rotating pin, wherein the one or more standoffs each comprise a first end and a second end, and further wherein the first end of the one or more standoffs is connected to the mounting flange and the second end of the one or more standoffs is connected to the claw assembly extractor via the clevis pivot plate.

15. The apparatus of claim **14**, further including a rail spike driver for driving the railroad spike into the rail tie, wherein the rail spike driver is interchangeable with the claw assembly extractor by removing the clevis pivot plate and attaching the rail spike driver to the one or more standoffs.

16. The apparatus of claim **1**, further including a rectangular leveling block located on a side of a bottom footer of the lower housing of the main housing, wherein the leveling block is utilized to level the main housing and the rail spike remover when removing a railroad spike.

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